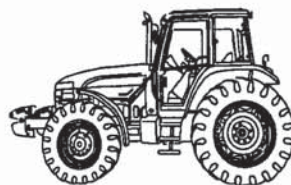


Tractors
8160
8260
8360
8560

OPERATOR'S MANUAL



NEW HOLLAND

TO THE OWNER:

The warranty coverage that is extended to your tractor is explained in the Warranty and Limitation of Liability form. Your dealer will provide you with a copy of the warranty and retain a copy which you have signed. After you read the warranty, ask your dealer to explain any points that you may not understand.

This tractor was designed to power and propel itself. It is intended for use in normal and customary agricultural applications.

Do not modify or alter or permit anyone else to modify or alter this tractor or any of its components or any tractor function without first consulting an authorized New Holland dealer. If you have any questions regarding tractor modifications, contact New Holland North America, Inc., 500 Diller Ave., New Holland, PA 17557.

A Roll Over Protection Structure (ROPS) or a safety cab incorporating a Roll Over Protection Structure (ROPS) and a seat belt were standard equipment for the tractor at the time of factory assembly. If the ROPS/Safety Cab has been modified or removed by the original purchaser, it is recommended that you equip your tractor with a ROPS/Safety Cab and seat belt. A ROPS/Safety Cab is effective in reducing injuries during tractor overturn accidents. Overturning a tractor without a ROPS can result in serious injury or death. ROPS/Safety Cab and seat belts are available for your tractor. If your tractor is not equipped with a ROPS/Safety Cab and seat belt, see your New Holland dealer.

Your safety and the safety of those around you depends upon the care and good judgment you use while operating this equipment. Read the safety precautions carefully.

For a complete list of the delivery service checks performed by your dealer, refer to DELIVERY REPORT in this manual. The first copy is your record of the service performed and the second copy, which is to be removed from the manual, is your dealer's record. **MAKE SURE THAT YOU AND THE DEALER SIGN BOTH COPIES.**

After you have operated the tractor for 50 hours, take your tractor and this manual to your selling dealer. He will perform the factory recommended 50-hour service. You will be responsible for the cost of lubricants, fluids, filters and other items replaced as part of normal maintenance. Prior to taking the tractor to your selling dealer for service, it is recommended that you contact them to determine any other charges for which you may be responsible.

All data given in this book is subject to production variations. Dimensions and weights are approximate only and the illustrations do not necessarily show tractors in standard condition. For exact information about any particular tractor please consult your New Holland dealer.



CAUTION: THIS SYMBOL IS USED THROUGHOUT THIS BOOK WHENEVER PERSONAL SAFETY IS INVOLVED. TAKE TIME TO READ AND FOLLOW THE INSTRUCTIONS. BE CAREFUL!

CAUTION: PICTURES IN THIS MANUAL MAY SHOW PROTECTIVE SHIELDING OPEN OR REMOVED TO BETTER ILLUSTRATE A PARTICULAR FEATURE OR ADJUSTMENT.

BE CERTAIN, HOWEVER, TO CLOSE OR REPLACE ALL SHIELDING BEFORE OPERATING THE MACHINE.

IMPROVEMENTS

New Holland North America, Inc. is continually striving to improve its products. We reserve the right to make improvements or changes when it becomes practical and possible to do so, without incurring any obligation to make changes or additions to the equipment sold previously.

New Holland Technical Manuals

Manuals are available from your Dealer for the operation, service and repair of your machine. For prompt, convenient service, contact your Dealer for assistance in obtaining the manuals for your machine.

Always give the Machine Name, Model and Serial Number of your machine so your Dealer can provide the correct manuals for your machine.

CALIFORNIA

Proposition 65 Warning

Diesel engine exhaust and some of its constituents are known to the State of California to cause cancer, birth defects, and other reproductive harm.

Battery posts, terminals and related accessories contain lead and lead compounds. Wash hands after handling.

CNH America LLC is continually striving to improve its products. We reserve the right to make improvements or changes when it becomes practical and possible to do so, without incurring any obligation to make changes or additions to the equipment sold previously.



NEW HOLLAND NORTH AMERICA, INC. AND
NEW HOLLAND CANADA, LTD.

NEW HOLLAND WARRANTY AND LIMITATION OF LIABILITY - AGRICULTURAL PRODUCTS

COVERAGE PROVIDED

New Holland North America, Inc. or New Holland Canada, Ltd., hereinafter called "Company" warrants to the retail purchaser of each new Product (as listed below) that the Selling Dealer will repair or replace any part thereof found to be defective in materials or workmanship within the following periods. This warranty is for the benefit of the original or subsequent purchaser.

BASIC WARRANTY

Product	Warranty Period (whichever comes first)
-Harvesting, Materials Handling Equipment and Implements	12 Months
-Extended New Holland Engine Warranty for Harvesting Products*	An Additional 12 Months or 2000 Hours
-Compact Tractors, Model 1530, 1630, 1725, 1925, and TC Models	24 Months or 1500 Hours
-Extended Power Train Warranty**	An Additional 12 Months or 1500 Hours
-Agricultural Tractors (except as noted), Including BiDirectional	12 Months
-Extended Power Train Warranty**	An Additional 12 Months or 2000 Hours
-Tractors, 70 Series	36 Months or 3000 Hours
-Tractors, 80/82 Series	24 Months or 2000 Hours
-Auger Headers	12 Months
-Replacement Parts	90 days or to end of Basic Warranty (whichever is longer)
*Allison transmissions, Caterpillar, Cummins and Deutz engines are warranted by their respective manufacturers.	
**The components covered by extended Power Train warranty consists of the following:	

ENGINE - All internal lubricated parts, cylinder block, cylinder head, oil pan, oil pump, seals & gaskets, head gasket, fuel injection pump and lines, turbocharger unit (factory installed), timing gear cover, timing gears, and valve cover

TRANSMISSION - Transmission case and all internal lubricated parts, torque converter, auxiliary drive axle transfer case, seals and gaskets.

MAIN DRIVE AXLE(S) - Center & drive axle housing and all internal lubricated parts, axle shafts, bearings (wheel and axle hub), final drive housing and all internal lubricated parts, auxiliary drive axle transfer case, PTO-clutch, internal shafts and bearings, seals and gaskets.

AUXILIARY DRIVE AXLE - Axle housing and all internal lubricated parts, axle shafts, bearings (wheel and axle hub), final drive housing and all internal lubricated parts, seals and gaskets, drive shaft and universal joints.

LIMITATIONS, INCLUDING DISCLAIMER OF IMPLIED WARRANTIES AND CONSEQUENTIAL DAMAGES

This warranty gives you specific legal rights and you may also have other rights which vary, depending on state or provincial laws.

New Holland North America, Inc. or New Holland Canada, Ltd. does not authorize any person or dealer to create for it any other obligation or liability in connection with these products. TO THE EXTENT ALLOWED BY LAW, ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS APPLICABLE TO THIS PRODUCT IS LIMITED TO THE STATED DURATION OF THIS WRITTEN WARRANTY. NEITHER COMPANY NOR THE SELLING DEALER SHALL BE LIABLE FOR LOSS OF THE USE OF THE PRODUCT, LOSS OF TIME, INCONVENIENCE, COMMERCIAL LOSS OR CONSEQUENTIAL DAMAGES.

Some states and provinces do not allow limitations on how long an implied warranty will last or the exclusion or limitation of incidental or consequential damages, so the above limitations or exclusions may not apply to you.

The remedy of repair or replacement of a defective part during the warranty period herein specified shall be the purchaser's exclusive remedy.

PROTECTIVE EQUIPMENT

Rollover protective structure (ROPS) and seat belts are provided as standard equipment on all New Holland agricultural tractors and we strongly recommend their use. Customers who elect to remove or not use this protection do so at their own risk.

- I acknowledge the existence of OSHA regulations pertaining to ROPS/FOPS. _____
- The correct Operator's Manual has been furnished to me. _____
- The correct Operator's Manual has been reviewed with me by the selling dealer and will be furnished to me upon delivery of the product. _____
- Safety precautions were explained to me by the selling dealer. _____
- Safety features of the product were explained to me by the selling dealer. _____
- The dealer has reviewed any applicable Federal Emissions Warranty and I understand its provisions. _____

ACKNOWLEDGEMENT/WARRANTY TRANSFER

The blank spaces under "Protective Equipment" have been filled in and are correct, and I acknowledge that I have read and I accept this Warranty and Limitation of Liability.

Purchaser _____	Dealer _____ Code _____
Address _____	Address _____
City _____ State _____ Zip _____	City _____ State _____ Zip _____
Model _____ Serial No. _____	Retail Date _____ / _____ / _____
Attachment Model _____ SN _____	
Attachment Model _____ SN _____	
Purchaser _____ Date _____	Dealer _____ Date _____
Signature	Signature

NEW HOLLAND WARRANTY DETAIL

The warranty period will begin on date of original retail sale or date of original use, whichever is earlier.

- The obligation of Company to the purchaser under this warranty is limited to the repair or replacement of defective parts by an authorized New Holland dealer and will be done free of charge for both parts and labor using genuine New Holland replacement parts. Repair or replacement in accordance with this warranty shall constitute fulfillment of all liabilities of Company and the Selling Dealer in respect to such Products.
- Repairs or replacements will be performed by the Selling Dealer, following delivery of the Product by the purchaser to the Dealer's place of business. When the purchaser has moved a long distance from the Selling Dealer, or the Selling Dealer is no longer in business, any New Holland dealer authorized to sell and service the described Products may perform the repair at its dealership.
- The Selling Dealer shall review these warranty provisions with the purchaser prior to retail sale, secure his acknowledgement of delivery of this warranty and record the date of original retail sale or date of original use.
- To obtain warranty service, the purchaser must (1) report the product defect to an authorized New Holland dealer and request repair within the applicable warranty term and (2) present evidence of the warranty start date.

WHAT IS NOT COVERED BY THE WARRANTY?

This warranty shall NOT apply under the following conditions:

- (i) With respect to vendor warranty items such as Allison transmissions and Deutz, Cummins and Caterpillar engines, or tires, tubes, and attachments which shall be warranted by their manufacturer, or local representative thereof.
- (ii) If the unit has been subject to misapplication, abuse, misuse, negligence of proper maintenance or other negligence, fire or other accident.
- (iii) If parts or attachments other than those made or marketed by New Holland North America, Inc. or New Holland Canada Ltd., have been used in connection with the unit, and in the sole judgment of Company such use affects its performance, stability or reliability.
- (iv) If the unit has been altered or repaired outside of a New Holland dealership in a manner which, in the sole judgment of Company, affects its performance, stability or reliability.
- (v) Batteries are covered by a separate pro-rata adjustment warranty. The pro-rata plan covers the battery fully for the basic product warranty period as indicated, with any remaining warranty pro-rated according to the months of service.
- (vi) The purchaser shall be responsible for payment of dealer travel time to the machine or to deliver the machine to the dealer's service shop for repair. New Holland warranty does not cover delivery charges or travel time.
- (vii) The Company shall have no liability for used equipment sold beyond the specified coverage period.
- (viii) No warranty shall apply to damage resulting from accident or damage caused by environment (such as exposure to corrosive material). The Company shall not be responsible for rental equipment used to replace the equipment being repaired.
- (ix) This warranty shall NOT apply to normal maintenance services (such as tune-ups, fuel injection system cleaning or wheel, brake and clutch adjustments), to normal replacement of service items (such as filters and brake or clutch linings), or to normal deterioration due to use or exposure (such as belts and exterior finish). New Holland shall not be responsible for normal replacement parts such as cutting knives, chains, belts, clutches, filters, oil, or other parts which are worn out, unless they are determined to be defective in material or workmanship.
- (x) This warranty shall NOT apply to any Product which is normally operated outside of the United States, and/or Canada.
- (xi) This warranty shall NOT apply if the purchaser, insurance company, or any other entity or individual acting on behalf of the purchaser seeks reimbursement for the dollar value of the repair(s) or replacement(s) covered under this warranty.
- (xii) If the injection pump has been set for fuel delivery above New Holland specifications.

RIGHT TO MAKE DESIGN CHANGES

Company reserves the right to make changes in the design and other changes in its products at any time and from time to time without notice and without incurring any obligation with respect to any product previously ordered from it, sold or shipped by it.

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OWNER ASSISTANCE

We at New Holland and your New Holland dealer want you to be completely satisfied with your investment. Normally any problems with your equipment will be handled by your dealer's Service Department. Sometimes, however, misunderstanding can occur. If your problem has not been handled to your satisfaction, we suggest the following.

1. Contact the owner or General Manager of the dealership, explain the problem, and request assistance. When additional assistance is needed, your dealer has direct access to our branch office.
2. If you cannot obtain satisfaction by doing this, contact the branch office in your area and provide them with:
 - Your name, address, and telephone number
 - Machine model and serial number
 - Dealership name and address
 - Machine purchase date and amount of use
 - Nature of problem

Atlanta

4727 N Royal Atlanta Dr Suite P
Caller Service 105018
Tucker, GA 30085-5018
Telephone: (404) 723-3602
States: AL, FL, GA, KY, MS,
NC, SC, TN, VA

Dallas

1340 Walnut Hill Lane Bldg 2
P.O. Box 167528
Irving, TX 75016-7528
Telephone: (214) 756-4914
States: AR, AZ, CA, CO, HI, KS,
LA, MO, NM, NV, OK, TX, UT

Minneapolis

6301 W Old Shakopee Rd
P.O. Box 1342
Minneapolis, MN 55440-1342
Telephone: (612) 887-4200
States: AK, IA, ID, IL, MN, MT,
ND, NE, OR, SD, WA, WI, WY

New Holland

200 Commerce St.
P.O. Box 527
Mountville, PA 17554-0527
Telephone: (717) 285-8350
States: CT, DE, IN, MA, MD, ME,
MI, NH, NJ, NY, OH, PA, RI, VT,
WV

Calgary

Suite 220
3030 Third Ave. NE
Box 1616, Stn M
Calgary, AB
CANADA T2P 2M7
Telephone: (403) 569-3212

3. If you need further assistance contact:

*Service Department
Mail Station 500
New Holland North America, Inc.
New Holland, PA 17557*

When contacting your branch office or Service Department, be aware that your problem will likely be resolved in the dealership using the dealer's facilities, equipment, and personnel. So it is important that your initial contact be with the dealer.

A Service Publications Catalog & Order Form is available which lists the operator's and service manuals for many prior model and most current model Ford - New Holland - Versatile tractors, equipment, and consumer products. To obtain a copy of this catalog, please call 1-800-635-4913.

TO THE OWNER

GENERAL

This Manual has been prepared to assist you in the correct procedure for running-in, driving and operating and for the maintenance your new tractor. Your tractor, which was designed to power and propel itself, is intended for use in normal and customary agricultural applications.

Read this Manual carefully and keep it in a convenient place for future reference. If at any time you require advice concerning your tractor, do not hesitate to contact your authorised dealer. He has factory trained personnel, genuine manufacturers' parts and the necessary equipment to carry out all your service requirements.

Your tractor has been designed and built to give maximum performance, economy and ease of operation under a wide variety of operating conditions. Prior to delivery, the tractor was carefully inspected, both at the factory and by your dealer to ensure that it reaches you in optimum condition. To maintain this condition and ensure trouble-free operation, it is important that the routine services, as specified in section 3 of this Manual, are carried out at the recommended intervals.

CLEANING YOUR TRACTOR

Your tractor is a state-of-the-art machine with sophisticated, electronic controls. Keep this in mind when cleaning the tractor, particularly if using a high pressure washer. Even though every precaution has been taken to safeguard electronic components and connections, the pressure generated by some of these machines is such that complete protection against water ingress cannot be guaranteed.

- When using a high pressure washer, do not stand too close to the tractor and avoid directing the jet at electronic components, electrical connections, breathers, seals, filler caps, etc.
- Never direct a cold water jet at a hot engine or exhaust.

SAFETY

Pages 0-6 to 0-9 list the precautions to be observed to ensure your safety and the safety of others. Read the safety precautions and follow the advice offered **before** operating the tractor.

PRE-DELIVERY INSPECTION AND 50 HOUR SERVICE

At the back of this Manual (just before the index) you will find pre-delivery inspection and 50-hour service reports. The second sheet is the dealers' copy of the P.D.I. report and should be removed by the dealer after the inspection has been carried out. The first sheet is your copy of the P.D.I. report. **Ensure that you and the dealer sign both copies.**

After you have operated the tractor for 50 hours, take your tractor, together with this Manual, to your dealer. He will then perform the factory recommended 50 hour service and complete the service report sheets. The second sheet is the dealer's copy and should be removed by the dealer after the service has been carried out. The first sheet is your copy of the service performed. **Again, ensure that you and the dealer sign both copies.**

SERVICE PARTS

It should be pointed out that genuine parts have been examined and approved by the Company. The installation and/or use of 'non-genuine' parts could have negative effects upon the design characteristics of your tractor and thereby affect its safety. The Company is not liable for any damage caused by the use of 'non-genuine' parts and accessories.

WARRANTY

Your tractor is warranted according to legal rights in your state/province and the agreement you signed with the selling dealer.

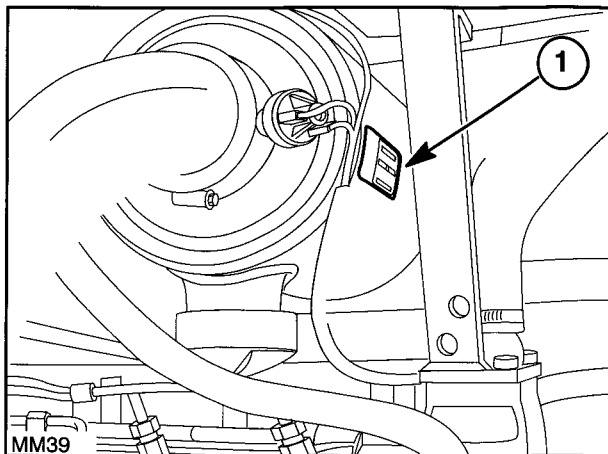
PRODUCT IDENTIFICATION

The tractor and major components are identified using serial numbers and/or manufacturing codes. Tractor identification data must be supplied to the dealer when requesting parts or service and will also be needed to aid in identifying the tractor if it is ever stolen.



The following provides the locations of the identification data.

Vehicle Identification Plate

The vehicle identification plate, 1, is located on the front of the air cleaner, at the right-hand end, as shown. Record the information on the sample identification plate provided below.

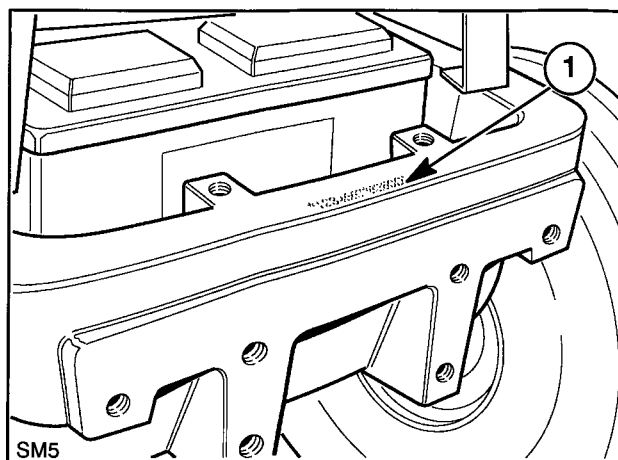


0-1

 NEW HOLLAND	TRACTOR NUMBER	
	<input type="text"/>	
	MODEL	DRIVELINE
	<input type="text"/>	<input type="text"/>
New Holland U.K. Limited	ENGINE	
	<input type="text"/>	
	Made in England	
	82009127	

Tractor Identification

The serial number and model identification information is stamped on the top of the front support (1). These numbers are also repeated on the vehicle identification plate reproduced above.

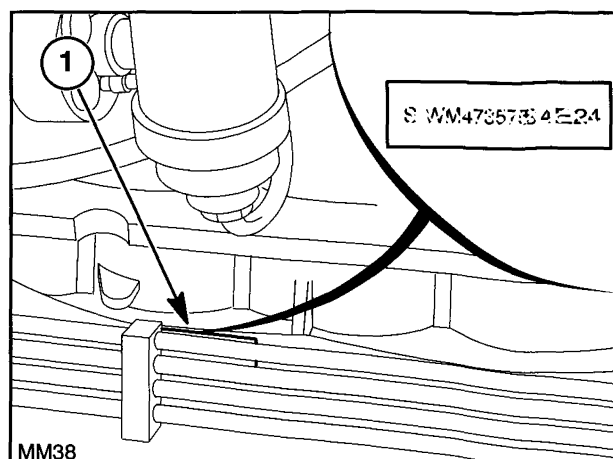


0-2

Engine Identification

The engine serial number and date code are stamped on a lug (1) protruding from the rear, right-hand side of the engine. This information is repeated on the vehicle identification plate. Record the information below for quick reference.

Serial No. _____



0-3

The engine identification plate is located on the right-hand side of the rocker cover, toward the rear of the engine. Record the information on the identification plate reproduced.

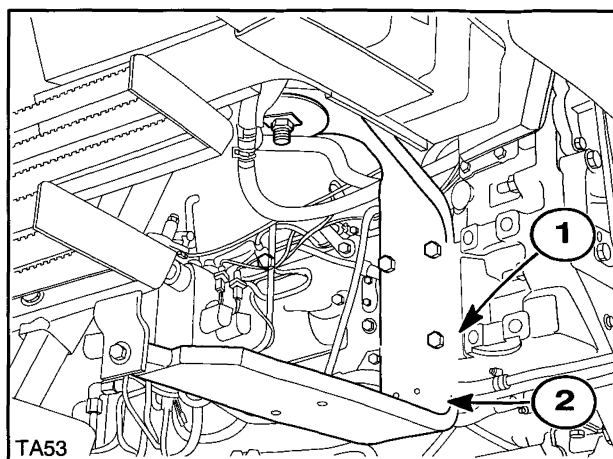
NEW HOLLAND U.K. LTD.	
ENGINE IDENTIFICATION	
SERIAL NO.	_____
BUILD DATE	_____
MODEL NO.	_____

0-4

Driveline Identification

The serial number is stamped on the right-hand side of the axle housing on the lug (1) to which the bracket (2), that supports the cab/platform and auxiliary fuel tank, is bolted. There is no need to remove this bracket since the information is repeated on the vehicle identification plate (Figure 0-1). Record the information below for quick reference.

Serial No. _____



0-5

IMPORTANT ENVIRONMENTAL CONSIDERATIONS

Soil, air and water are vital factors of agriculture and life in general. Where legislation does not yet rule the treatment of some of the substances which are required by advanced technology, common sense should govern the use and disposal of products of a chemical and petrochemical nature.

The following are recommendations which may be of assistance:

- Become acquainted with and ensure that you understand the relative legislation applicable to your area.
- Where no legislation exists, obtain information from suppliers of oils, filters, batteries, fuels, anti-freeze, cleaning agents, etc., with regard to their effect on man and nature and how to safely store, use and dispose of these substances. Agricultural consultants will, in many cases, be able to help you as well.

HELPFUL HINTS

1. Avoid filling tanks using small fuel containers or inappropriate pressurized fuel delivery systems which may cause spills.

2. In general, avoid skin contact with all fuels, oils, acids, solvents, etc. Most of them contain substances which can be harmful to your health.
3. Modern oils contain additives. Do not burn contaminated fuels and/or waste oils in heating systems.
4. Avoid spills when draining off used engine coolant mixtures, engine, gearbox and hydraulic oils, brake fluids, etc. Do not mix drained brake fluids or fuels with lubricants. Store them safely until they can be disposed of in a proper way to comply with local legislation and available resources.
5. Modern coolant mixtures, i.e. antifreeze and other additives, should be replaced every two years. They should not be allowed to get into the soil but should be collected and disposed of safely.
6. Do not open the air-conditioning system yourself. Your dealer or air conditioning specialist has special tools for this purpose.
7. Repair any leaks in the engine fuel and cooling or hydraulic system immediately.
8. Do not increase the pressure in a pressurised circuit as this may lead to the components exploding.
9. Protect hoses during welding as weld splatter may burn a hole or weaken them, causing the loss of oils, coolant, etc.

SAFETY PRECAUTIONS

A careful operator is the best operator. Most accidents can be avoided by observing certain precautions. To help prevent accidents, read and take the following precautions **before** driving, operating or servicing the tractor. Equipment should be operated only by those who are responsible and instructed to do so.

PRECAUTIONARY STATEMENTS

Throughout this Manual you will see text in *italics*, preceded by the words **NOTE**, **ATTENTION**, **IMPORTANT**, **CAUTION**, **WARNING** or **DANGER**. Such text has the following significance:


Machine Safety


NOTE: *This text stresses a correct operating technique or procedure.*

ATTENTION: *This text warns the operator of potential machine damage if a certain procedure is not followed.*

IMPORTANT: *This text informs the reader of something that he needs to know to prevent minor machine damage if a certain procedure is not followed.*

Personal Safety

 **CAUTION:** *The word CAUTION is used where a safe behavioral practice, according to operating and maintenance instructions and common safety practices will protect the operator and others from accident involvement.*

 **WARNING:** *The word WARNING denotes a potential or hidden hazard which could possibly cause serious injury. It is used to warn operators and others to exercise due care and attention to avoid a surprise accident with machinery.*



DANGER: *The word DANGER denotes a forbidden practice in connection with a serious hazard.*

Failure to follow the CAUTION, WARNING and DANGER instructions may result in serious bodily injury or even death.

THE TRACTOR

1. Read the Operator's Manual carefully before using the tractor. Lack of operating knowledge can lead to accidents.
2. Only allow properly trained and qualified persons to operate the tractor.
3. To prevent falls, use the handrails and step plates when getting on and off the tractor. Keep steps and platform clear of mud and debris.
4. Replace all missing, illegible or damaged safety decals.
5. Keep safety decals free of dirt or grime.
6. Do not permit anyone but the operator to ride on the tractor. There is no safe place for extra passengers.
7. Keep children away from the tractor and farm machinery at all times.
8. Do not modify or alter or permit anyone else to modify or alter the tractor or any of its components or any tractor function without first consulting your dealer.
9. Install all guards before starting the engine or operating the tractor.

DRIVING THE TRACTOR

1. Always sit in the driver's seat while starting or driving the tractor.
2. When driving on public roads, have consideration for other road users. Pull in to the side of the road occasionally to allow any following traffic to pass. Do not exceed the legal speed limit set in your area.
3. Use the hazard warning lights when driving on public roads to indicate that the vehicle is slow moving and is a possible hazard.
4. Use low beam lights when meeting a vehicle at night. Make sure the lights are adjusted to prevent blinding the driver of an oncoming vehicle.
5. Reduce speed before turning or applying the brakes. Ensure that both brake pedals are locked together when travelling at road speeds or when on public roads. Brake both wheels simultaneously when making an emergency stop.
6. On front wheel drive tractors, the drive to the front axle is automatically engaged, to provide four wheel braking, when both footbrakes are applied. Owners should be aware of the effectiveness of four wheel braking which greatly enhances braking performance. Appropriate care should be exercised during hard braking.
7. Use extreme caution and avoid hard application of the tractor brakes when towing heavy loads at road speeds.
8. Keep the tractor in the same gear when going downhill as would be used when going uphill. Do not coast or freewheel down hills.
9. Any towed vehicle whose total weight exceeds that of the towing tractor must be equipped with brakes for safe operation.
10. Never apply the differential lock when turning. When engaged, the differential lock will prevent the tractor from turning.
11. Always check overhead clearance, especially when transporting the tractor. Watch where you are going, especially at row ends, on roads and around trees and low overhanging obstacles.
12. To avoid overturns, drive the tractor with care and at speeds compatible with safety, especially when operating over rough ground, when crossing ditches or slopes and when turning corners.
13. Use extreme caution when operating on steep slopes.

14. If the tractor becomes stuck or the tires are frozen to the ground, reverse the tractor out to prevent overturning.

OPERATING THE TRACTOR

1. Apply the parking brake, place the P.T.O. control in the 'OFF' position, the lift control lever in the down position, the remote control valve levers in the neutral position and the transmission levers in neutral before starting the tractor.
2. Do not start the engine or operate controls (other than the external hydraulic lift switches) while standing beside the tractor. Always sit in the tractor seat when starting the engine or operating the controls.
3. Do not bypass the safety start switch. Consult your authorised dealer if your safety start controls malfunction. Use jump leads only in the recommended manner. Improper use can result in a tractor runaway.
4. Avoid accidental contact with the gear shift levers while the engine is running. Unexpected tractor movement can result from such contact.
5. Do not get off the tractor while it is in motion.
6. If the power steering or engine ceases operating, stop the tractor immediately as the tractor will be more difficult to control.
7. Before leaving the tractor, park the tractor on level ground, apply the parking brake, lower attached implements to the ground, disengage the P.T.O. and stop the engine.
8. Do not park the tractor on a steep incline.
9. The cab is designed to provide the minimum noise level at the operator's ears and meets or exceeds applicable standards in this respect. However, noise (sound pressure level) in the workplace can exceed 85 dB(A) when working between buildings or in confined spaces, with cab windows open. Therefore, it is recommended that operators wear suitable ear protectors when operating in high noise level conditions.
10. Do not run the tractor engine in an enclosed building without adequate ventilation. Exhaust fumes are toxic and can cause death.
11. Pull only from the swinging drawbar or the 3 point hitch in the lowered position. See section 2. Use only a drawbar pin that locks in place. Pulling from the tractor rear axle or any point above the axle may cause the tractor to overturn.

12. Always select Position Control when attaching equipment and when transporting equipment. Be sure hydraulic couplers are properly installed and will disconnect safely in case of accidental detachment of the implement.
13. If the front end of the tractor tends to rise when heavy implements are attached to the three-point hitch, install front end or front wheel weights. Do not operate the tractor with a light front end.
14. Ensure any attached equipment or accessories are correctly installed, are approved for use with the tractor, do not overload the tractor and are operated and maintained in accordance with the instructions issued by the equipment or accessory manufacturer.
15. Remember that your tractor, if abused or incorrectly used, can be dangerous and become a hazard both to the operator and to bystanders. Do not overload or operate with attached equipment which is unsafe, not designed for the particular task or is poorly maintained.
16. Do not leave equipment in the raised position when the vehicle is stopped or unattended.
17. Do not drive equipment near open fires.
18. Always wear protective equipment when working with toxic spray chemicals. Follow the directions on the chemical container.

OPERATING THE P.T.O.

1. When operating P.T.O.- driven equipment, shut off the engine, switch off the P.T.O. and wait until the P.T.O. stops before getting off the tractor and disconnecting the equipment.
2. Do not wear loose clothing when operating the power take-off or especially when near rotating equipment.
3. When operating stationary P.T.O.-driven equipment, always apply the tractor parking brake and block the rear wheels front and back.
4. To avoid injury, do not clean, adjust, unclog or service P.T.O. driven equipment when the tractor engine is running. Ensure that the P.T.O. is off.
5. Make sure the P.T.O. guard is in position at all times and always replace the P.T.O. cap when the P.T.O. is not in use.

SERVICING THE TRACTOR

1. The cooling system operates under pressure which is controlled by the expansion tank cap. It is dangerous to remove the cap while the system is hot. Always turn the cap slowly and allow the pressure to escape before removing the cap entirely. Never remove the cap from the top of the radiator unless the expansion tank pressure cap has first been removed.
 2. Do not smoke while refuelling the tractor. Keep any type of open flame away.
 3. Keep the tractor and equipment, particularly brakes and steering, maintained in a reliable and satisfactory condition to ensure your safety and comply with legal requirements.
 4. To prevent fire or explosion, keep open flames away from battery or cold weather starting aids. To prevent sparks which could cause explosion, use jumper cables according to instructions.
 5. Do not attempt to service the air conditioning system. It is possible to be severely frost bitten or injured by escaping refrigerant. Special equipment and instruments are required to service the air conditioning system. See your authorized dealer for service.
 6. Stop the engine before performing any service on the tractor.
 7. Hydraulic fluid and diesel fuel in the injection system operate under high pressure. Escaping hydraulic fluid or fuel under pressure can penetrate the skin causing serious injury. Unqualified persons should not remove or attempt to adjust a pump, injector, nozzle or any other part of the fuel injection or hydraulic systems. Failure to follow these instructions can result in serious injury.
- **Do not** use your hand to check for leaks. Use a piece of cardboard or paper to search for leaks.
 - Stop the engine and relieve pressure before connecting or disconnecting lines.
 - Tighten all connections before starting the engine or pressurizing lines.
 - If fluid is injected into the skin obtain medical attention immediately.

SAFETY PRECAUTIONS

8. Do not modify or alter or permit anyone else to modify or alter the tractor or any of its components or any tractor function without first consulting an authorized dealer.
9. Continuous long term contact with used engine oil may cause skin cancer. Avoid prolonged contact with used engine oil. Wash skin promptly with soap and water.
10. Keep equipment clean and properly maintained.
11. Dispose of all drained fluids and removed filters properly.
12. Tractor wheels are very heavy. Handle with care and ensure, when stored, that they cannot topple and cause injury.
6. Wipe up spilled fuel immediately.
7. Always tighten the fuel tank cap securely.
8. If the original fuel tank cap is lost, replace it with an approved cap. A non-approved cap may not be safe.
9. Never use fuel for cleaning purposes.
10. Arrange fuel purchases so that summer grade fuels are not held over and used in the winter.

DIESEL FUEL

1. Under no circumstances should gasoline, alcohol or blended fuels be added to diesel fuel. These combinations can create an increased fire or explosive hazard. In a closed container such as a fuel tank these blends are more explosive than pure gasoline. Do not use these blends.
2. Never remove the fuel cap or refuel with the engine running or hot.
3. Do not smoke while refuelling the tractor or when standing near fuel. Keep any type of open flame away.
4. Maintain control of the fuel filler pipe nozzle when filling the tank.
5. Do not fill the fuel tank to capacity. Fill only to the bottom of the filler neck to allow room for expansion.

SAFETY CAB OR ROPS

Your tractor is equipped with a safety cab or ROPS (Roll Over Protection System) which must be maintained in a serviceable condition. Be careful when driving through doorways or working in confined spaces with low headroom.

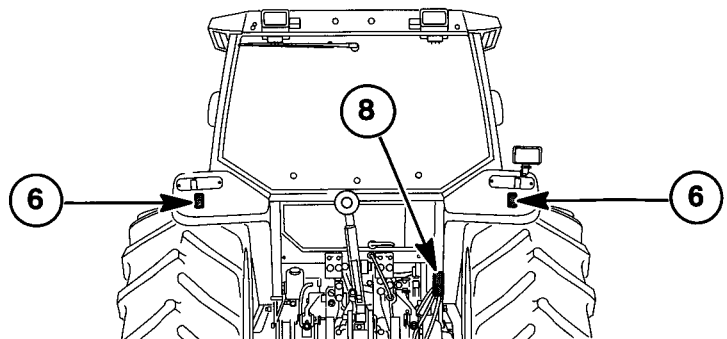
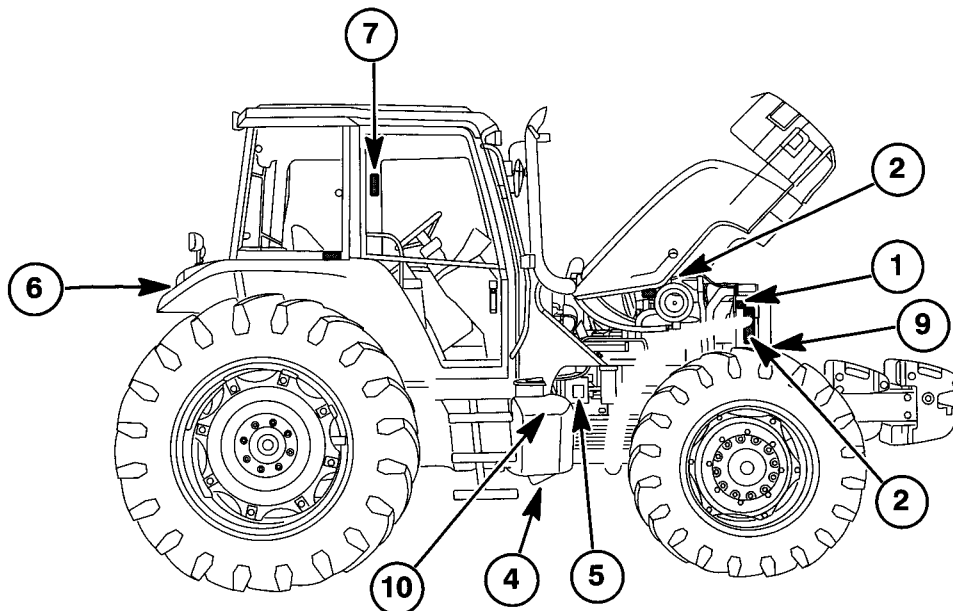
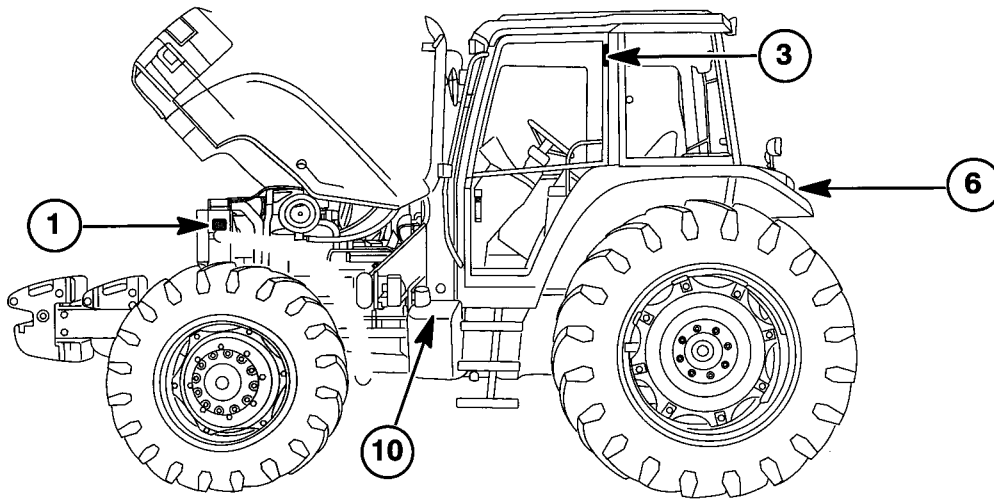
1. Do not modify, drill, weld or alter the safety cab or ROPS in any way.
2. Never attempt to straighten or weld any part of the cab frame, ROPS or retaining brackets which have suffered damage. By doing so you may weaken the structure and endanger your safety.
3. Do not secure any parts on the ROPS or attach your safety cab or ROPS with other than the special high tensile bolts and nuts specified.
4. Never attach chains or ropes to the cab or ROPS for pulling purposes.
5. Never take unnecessary risks even though your safety cab or ROPS affords you the maximum protection possible.

**Whenever you see this symbol  it means: ATTENTION!
BECOME ALERT! YOUR SAFETY IS INVOLVED!**

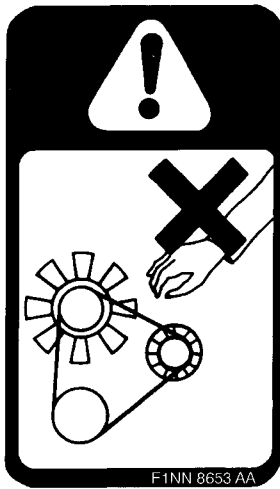
SAFETY DECALS

The decals reproduced on the following pages were installed on your tractor in the positions indicated in the drawings below. They are intended for your safety and for those working with you. Please take this Manual and walk around your tractor, noting the location of the

decals and their significance. Review the decals and operating instructions detailed in this Manual with all operators. Keep the decals clean and legible. If they become damaged or illegible, obtain replacements from your authorized dealer.



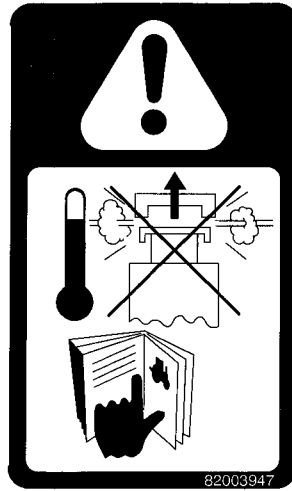
Replace all missing, damaged or illegible decals.



Part No. F1NN 8653 AA

1. Location: Left- and right-hand side of radiator/fan shroud

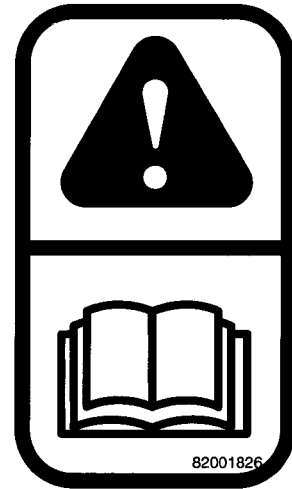
To prevent serious injury, keep hands and clothing away from rotating fan and drive belt.



Part No. 82003947

2. Location: Right-hand side of radiator and coolant overflow bottle

Warning! Pressurized cooling system. Allow to cool then remove cap carefully.



Part No. 82001826

3. Location: Right-hand 'B' pillar, inside cab

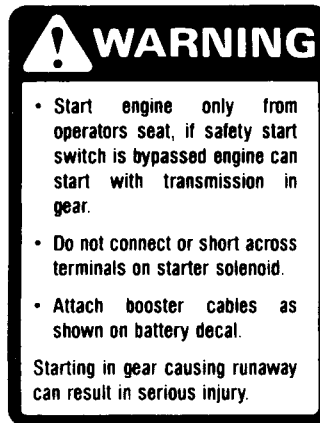
General warning. Read and understand all the warning notes printed in this Operator's Manual.



Part No. E6NN T835 MA

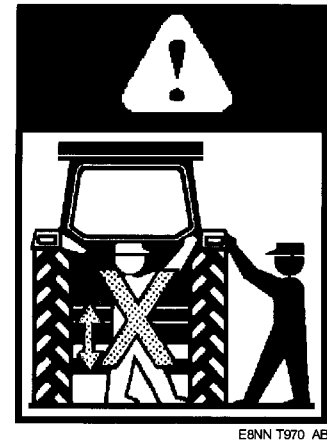
4. Location: Radar sensor mounting bracket

To avoid possible eye damage from micro-wave signals emitted by the radar sensor, do not look directly into the sensor face.



Part No. E1NN 16A901 EA

5. Location: Starting motor



Part No. E8NN T970 AB

6. Location: Rear of both fenders

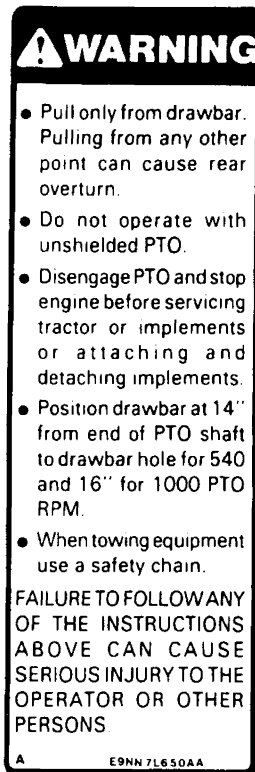
To avoid injury, do not stand on the implement or between the implement and tractor while operating the external lift controls.

Replace all missing, damaged or illegible decals.



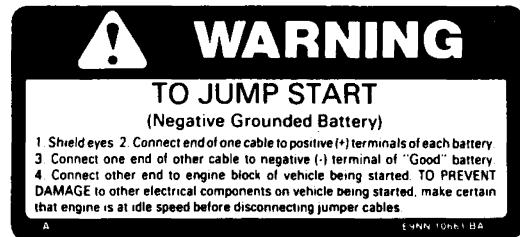
Part No. E9NN 16A901 GA

7. Location: Cab left-hand "B" pillar; ROPS frame, right-hand side (not shown)



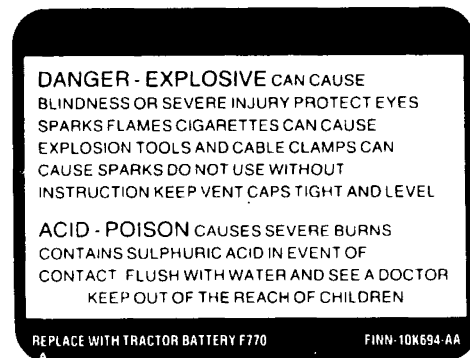
Part No. E9NN 7L650 AA

8. Location: Rear of ROPS or cab frame, right-hand side



Part No. E9NN 10661 BA

9. Location: Top of battery



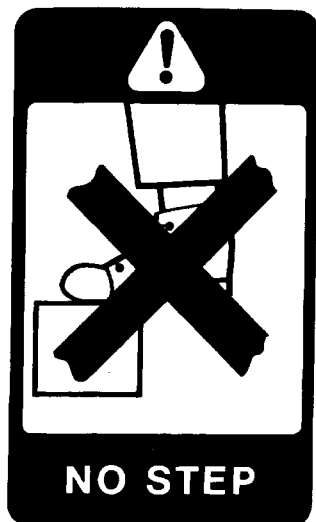
Part No. F1NN 10K694 AA

9. Location: Top of battery



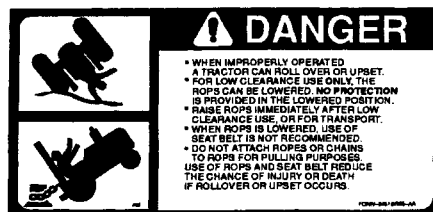
9. Location: Top of battery

Replace all missing, damaged or illegible decals.



Part No. F1NN 19N250 CA

10. Location: On front of fuel tank(s)



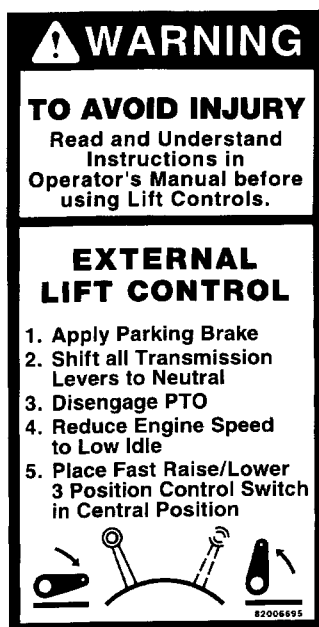
Part No. F0NN 94518R55 AA

Location: Folding ROPS - Center rear (not shown)



Part No. F1NN 2K106 AA

Location: Parking brake lever (not shown)



Part No. 82006695

Location: Hydraulic console (not shown)

UNIVERSAL SYMBOLS

As a guide to the operation of your tractor, various universal symbols have been utilised on the instruments,

controls, switches, and fuse box. The symbols are shown below with an indication of their meaning.

	Thermostart starting aid		Radio		P.T.O.		Position Control
	Alternator charge		Keep alive memory		Transmission in neutral		Draft Control
	Fuel level		Turn signals		Creeper gears		Accessory socket
	Automatic Fuel shut-off		Turn signals -one trailer		Slow or low setting		Implement socket
	Engine speed (rev/min x 100)		Turn signals -two trailers		Fast or high setting		%age slip
	Hours recorded		Front wind-screen wash/wipe		Ground speed		Hitch raise (rear)
	Engine oil pressure		Rear wind-screen wash/wipe		Differential lock		Hitch lower (rear)
	Engine coolant temperature		Heater temperature control		Rear axle oil temperature		Hitch height limit (rear)
	Coolant level		Heater fan		Transmission oil pressure		Hitch height limit (front)
	Tractor lights		Air conditioner		FWD engaged		Hitch disabled
	Headlamp main beam		Air filter blocked		FWD dis-engaged		Hydraulic and transmission filters
	Headlamp dipped beam		Parking brake		Warning!		Remote valve extend
	Work lamps		Brake fluid level		Hazard warning lights		Remote valve retract
	Stop lamps		Trailer brake		Variable control		Remote valve float
	Horn		Roof beacon		Pressurised! Open carefully		Malfunction! See Operator's Manual
			Warning! Corrosive substance				Malfunction! (alternative symbol)

SECTION 1

GENERAL INFORMATION

INTRODUCTION

This manual has been prepared to assist you in the correct procedure for running-in, driving, operating and maintaining your tractor.

The manual is divided into five sections. A comprehensive index is provided at the back of the manual.

Read this manual carefully and keep it, for future reference, in the storage box attached to the rear of the seat. If at any time you require advice concerning your tractor, do not hesitate to contact your authorized dealer. He has factory-trained personnel, genuine replacement parts, and the necessary equipment to carry out your service requirements.

Your tractor has been designed and built to give maximum performance, economy and ease of operation under a wide variety of operating conditions. Prior to delivery, the tractor was carefully inspected, both at the factory and by your dealer, to ensure that it reaches you in optimum condition. To maintain this condition and ensure trouble-free operation, it is important that the routine services, as specified in section 3 of this manual, are carried out at the recommended intervals.

All data given in this book is subject to production variations. Dimensions and weights are approximate only, and the illustrations do not necessarily show tractors in standard condition. For exact information about any particular tractor, please consult your authorized dealer.

Unless otherwise stated, reference to the right and left sides of the tractor are determined by sitting in the operator's seat facing forward.

The 'Safety Precautions' pages in the introductory section list the precautions to be observed to ensure your safety and the safety of others. Read the safety precautions carefully and follow the advice offered **before** operating the tractor.

This section of the Manual covers the following subjects:

Page	Subject
------	---------

- | | |
|------|--|
| 1-2 | Protective Guards. |
| 1-3 | Controls and Instruments. (This is a quick reference guide only. Operation and use of the various controls is discussed in section 2.) |
| 1-14 | Protecting the electronic/electrical systems during charging or welding. |
| 1-14 | Towing the tractor. |
| 1-15 | Carrying the tractor on a transporter. |
| 1-15 | Pre-operation checks. |



CAUTION: *Do not operate the tractor until you are thoroughly accustomed to the location and operation of all controls.*

PROTECTIVE GUARDS

Protective guards have been installed on your tractor. The guards are intended for your safety and for those working with you.

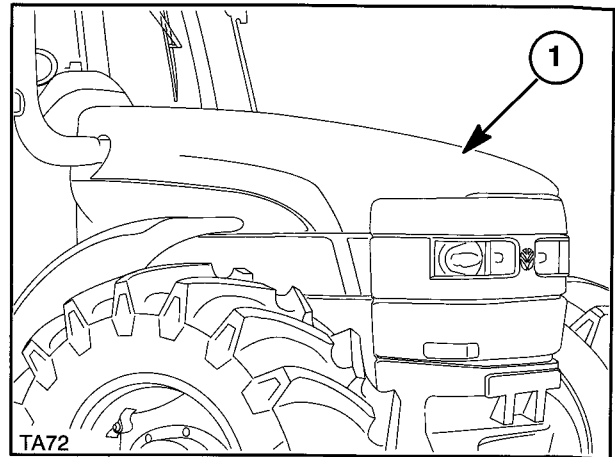


CAUTION: *Install all protective guards before starting or operating the tractor.*

ENGINE HOOD

The hood (1) covers the batteries and moving parts of the engine. The hood must be closed and correctly latched before operating the tractor.

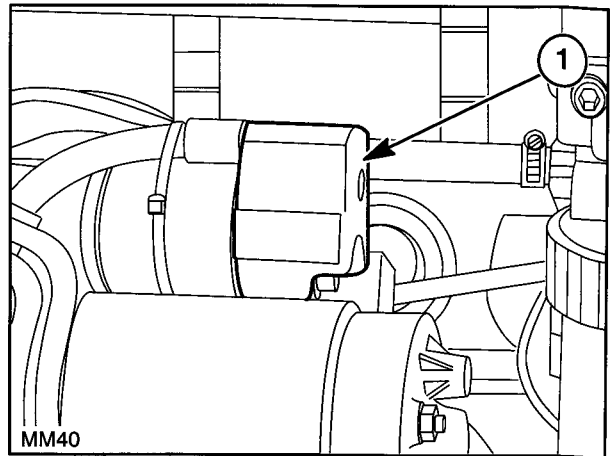
Additional guards are provided to prevent the fingers being trapped by the fan/air conditioner drive belt when the hood is lowered to the operating position.



1-1

STARTER SOLENOID GUARD

The guard (1) covers the starter solenoid electrical connections to prevent accidental contact. The guard must be installed whenever the batteries are connected to the electrical system.

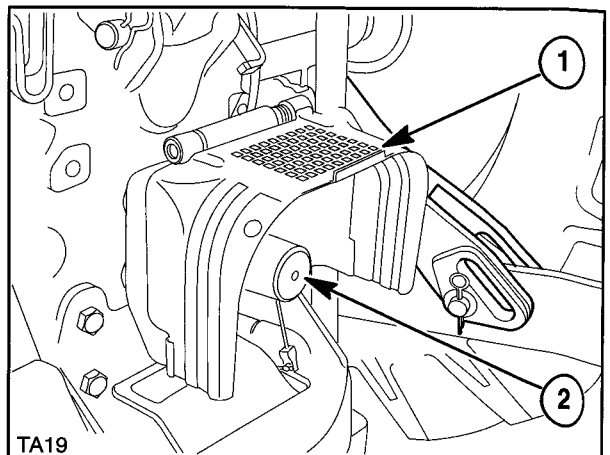


1-2

P.T.O. CAP AND GUARD

Install the cap (2), over the tractor PTO shaft when the shaft is not attached to an implement. The cap is a push fit onto its mount. Pull to remove. Store the cap when the P.T.O. is in use.

The flip-up guard (1), has a special spring-loaded hinge that will retain the guard in any one of several points between the horizontal and fully raised positions. The guard can be pivoted upwards to improve access to the P.T.O. shaft when attaching equipment.



1-3



CAUTION: *Do not remove the guard when the P.T.O. is in use. Do not modify the guard.*

CONTROLS AND INSTRUMENTS – LOCATION AND FUNCTION

The information on the following pages identifies, locates and briefly describes the function of the controls and instruments.

The controls have been divided into the following areas:

Cab/platform controls – Figure 1-4.

Instrument console controls – Figure 1-5.

Instrument panels – Figures 1-6 and 1-7.

Floor-mounted controls – Figures 1-8 to 1-9.

Overhead controls – Figure 1-10 to 1-12.

Transmission controls – Figures 1-13 to 1-15.

P.T.O. Controls – Figure 1-16

Electronic Management Unit – Figures 1-17 and 1-18.

Worklamp switch panel – Figures 1-19 and 1-20.

Electrical accessory panel – Figure 1-21.

Hydraulic controls – Figures 1-22 to 1-24.

Remote control valves – Figures 1-25 to 1-27.

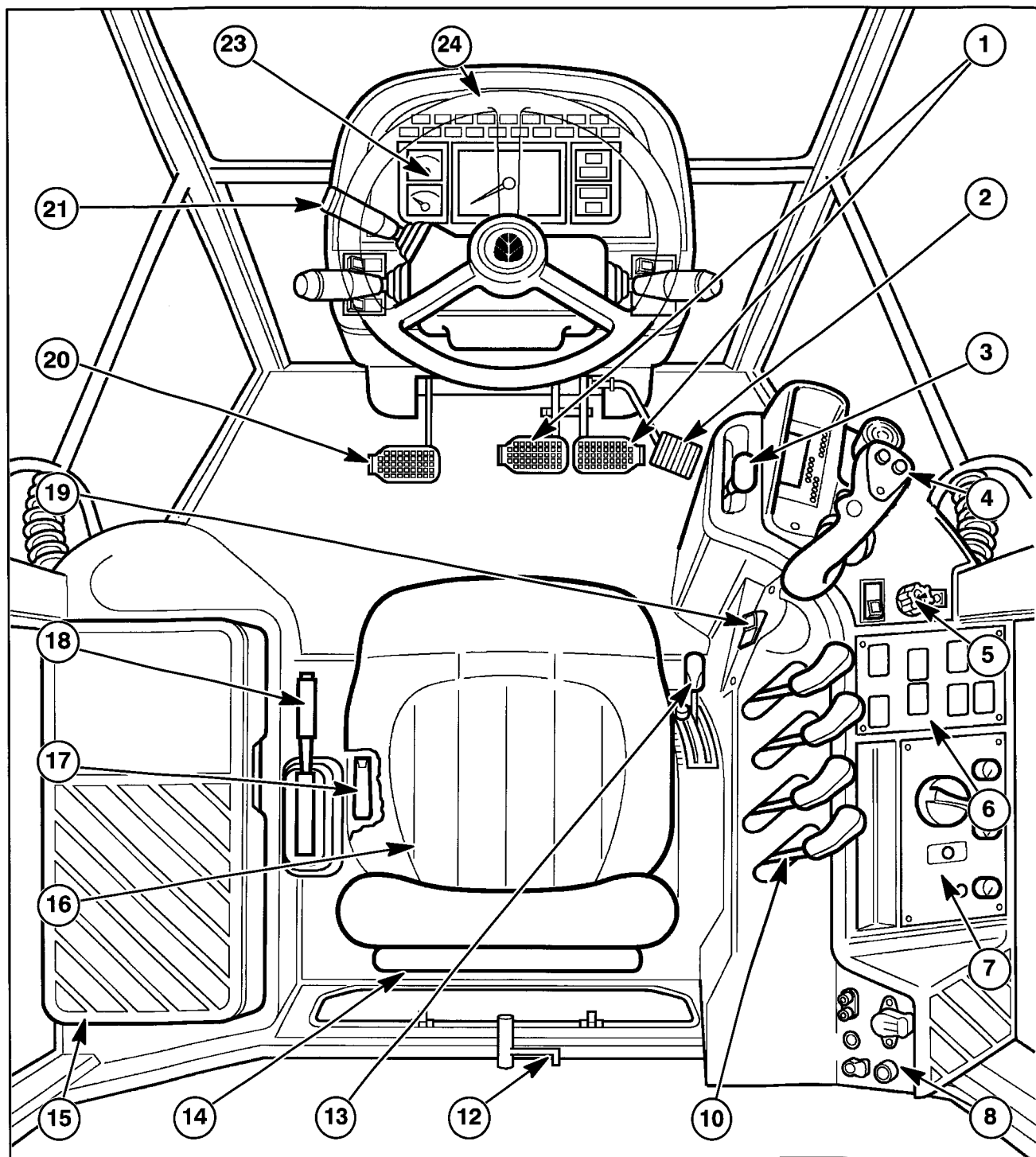
IMPORTANT: *The following information in this section is provided as a quick reference guide and is not intended as a replacement of the detailed operational information that appears in Section 2 – 'OPERATION'. For details on how to use the controls and check the instruments and warning lights read all of Section 2 before operating the tractor.*



CAUTION: *Do not operate the tractor until you are thoroughly accustomed with the location and operation of all controls.*

GENERAL INFORMATION

CAB/PLATFORM CONTROLS

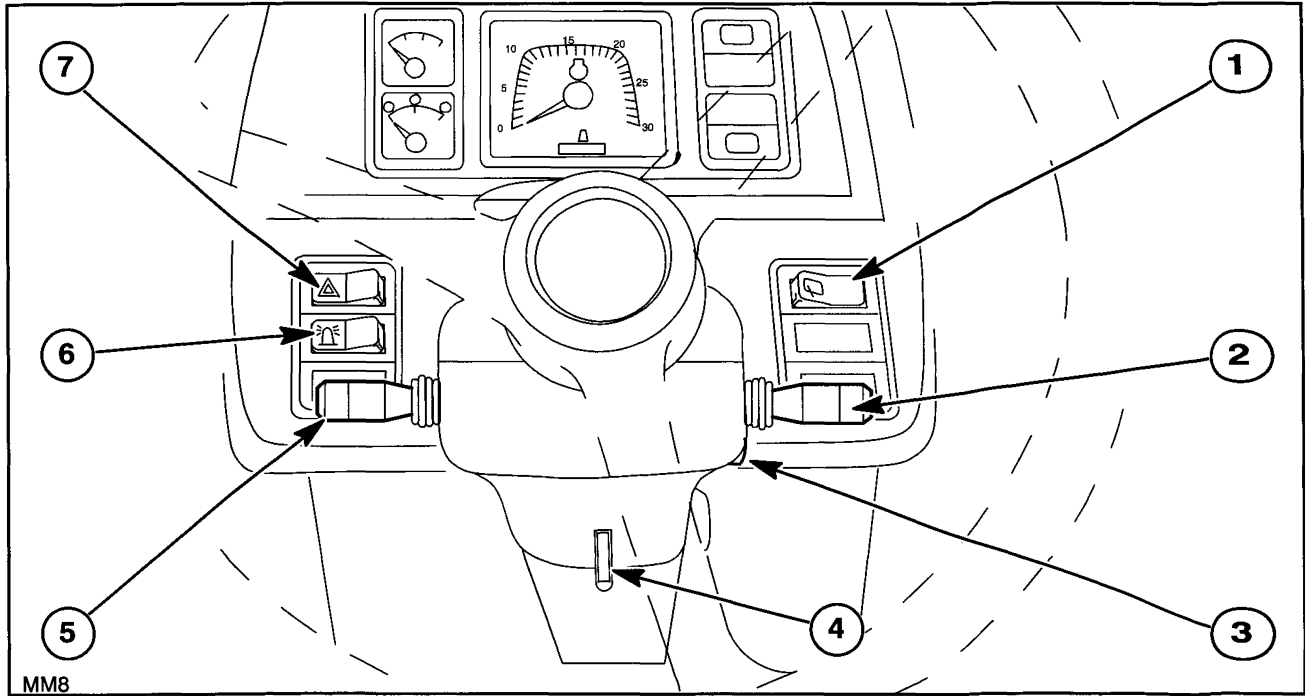


General View of Tractor Controls

1-4

- | | | |
|-------------------------------------|---|-----------------------------------|
| 1. Foot brakes | 10. Remote control valve levers | 18. Parking brake |
| 2. Foot throttle | 12. Rear window locking handle | 19. Fast raise/work switch |
| 3. Hand throttle | 13. Hydraulics controls | 20. Clutch/inching pedal |
| 4. Transmission controls | 14. Document storage box | 21. Shuttle lever |
| 5. P.T.O. controls | 15. Storage box | 23. Instrument panel and switches |
| 6. Electronic Management Unit (EMU) | 16. Operator's seat | 24. Steering wheel |
| 7. Electronic Draft Control unit | 17. Creeper gears lever
(where equipped) | |
| 8. Electrical accessory sockets | | |

INSTRUMENT CONSOLE CONTROLS



Instrument Console Controls

1-5

- | | |
|---|---|
| 1. Rear window wipe/wash control (where equipped) | 5. Multi-function switch (lights/turn signals/horn) |
| 2. Front windshield wipe/wash control | 6. Roof beacon switch (where equipped) |
| 3. Key-start/stop switch | 7. Hazard warning switch |
| 4. Steering column tilt/telescopic clamp lever | |

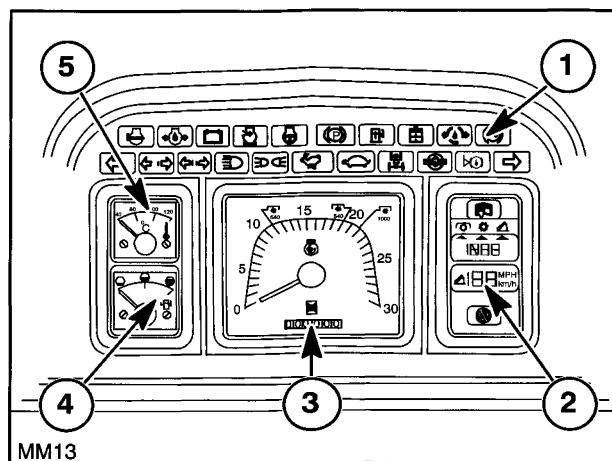
For complete operating instructions, see Section 2.

GENERAL INFORMATION

INSTRUMENT PANELS

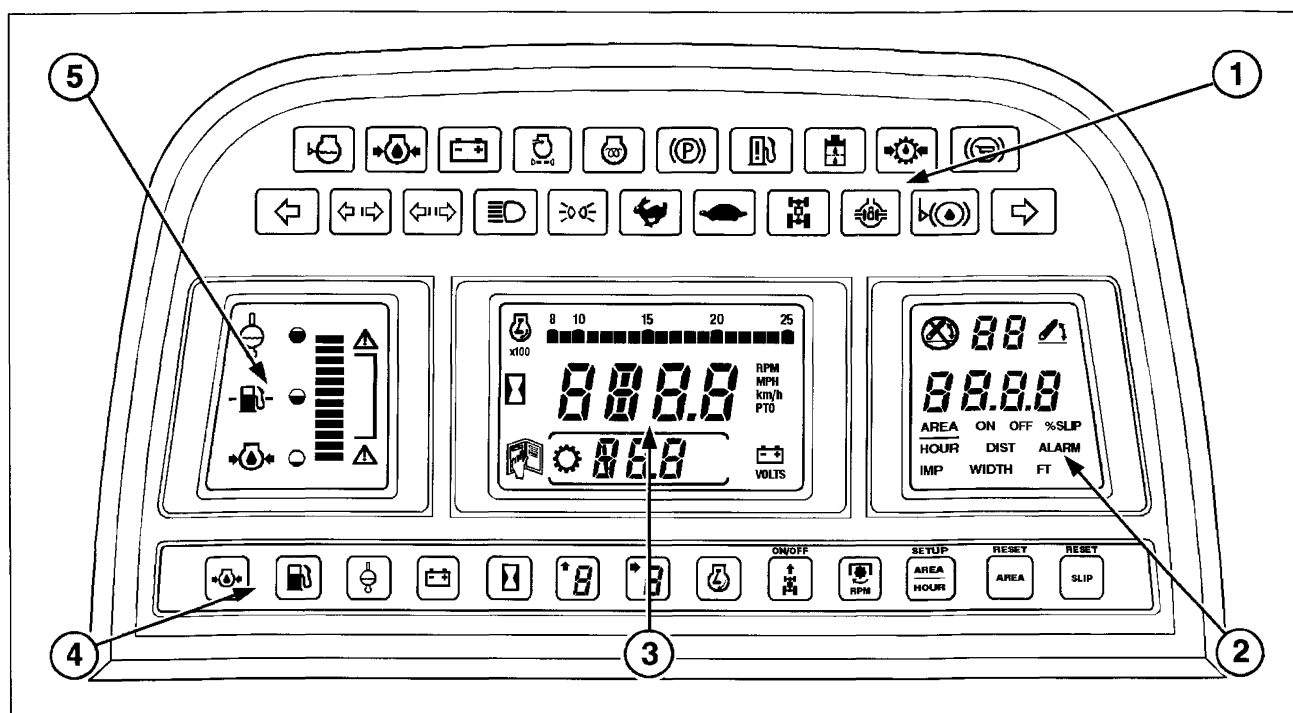
Analog/Electronic Instrument Console

1. Warning and indicator lights
2. Liquid crystal display panel
3. Proofmeter
4. Fuel gauge
5. Engine coolant temperature gauge



1-6

For complete operating instructions, see Section 2.



Electronic Instrument Console

1-7

- | | |
|---|--|
| <ol style="list-style-type: none"> 1. Warning and indicator lights 2. Tractor Performance Monitor (LCD) | <ol style="list-style-type: none"> 3. Central display panel (LCD) 4. Function buttons 5. Bargraph display (LCD) |
|---|--|

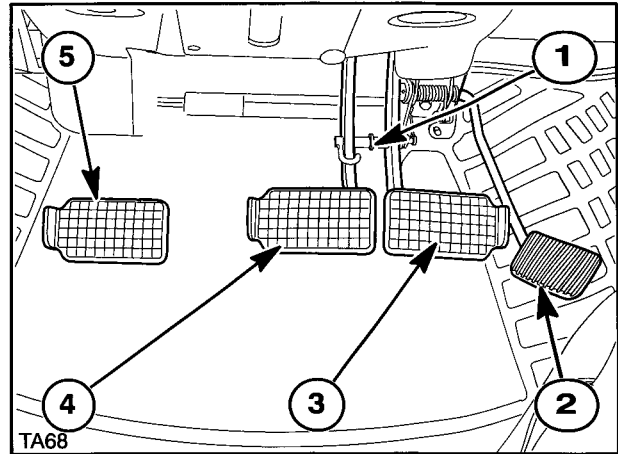
For complete operating instructions, see Section 2.

FLOOR-MOUNTED CONTROLS

Foot-operated Controls

1. Brake locking pin
2. Foot throttle
3. Right brake pedal
4. Left brake pedal
5. Clutch pedal

For complete operating instructions, see Section 2.

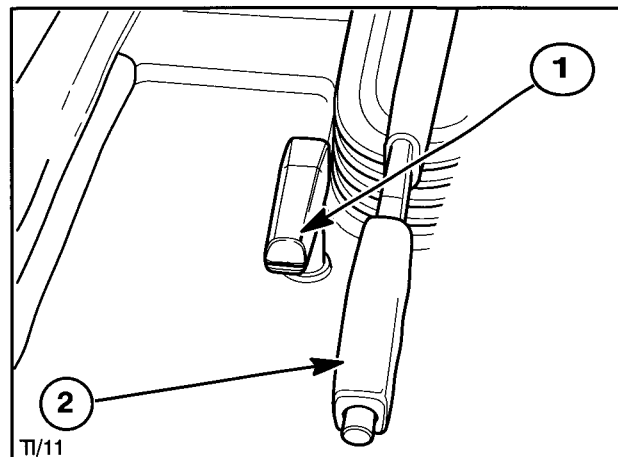


1-8

Floor-mounted Controls (left-hand side)

1. Creeper gears selector (where equipped) – pull up to engage creeper gears – push down to disengage.
2. Parking brake

For complete operating instructions, see Section 2.



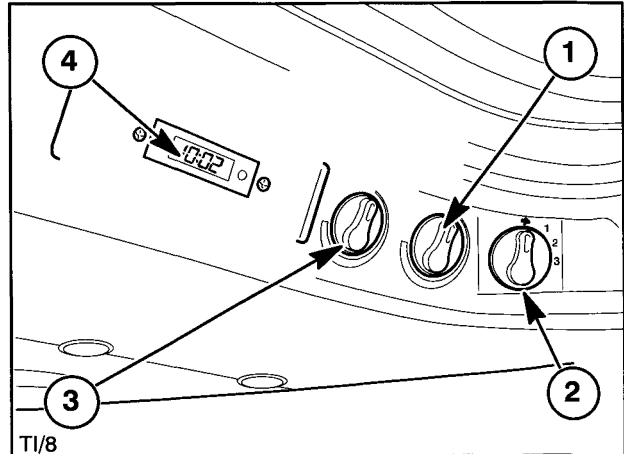
1-9

CAB ROOF-MOUNTED CONTROLS

Roof-mounted Controls

1. Air conditioner temperature control
2. 3-speed blower control
3. Heater temperature control
4. Optional radio/cassette player may be installed in this position

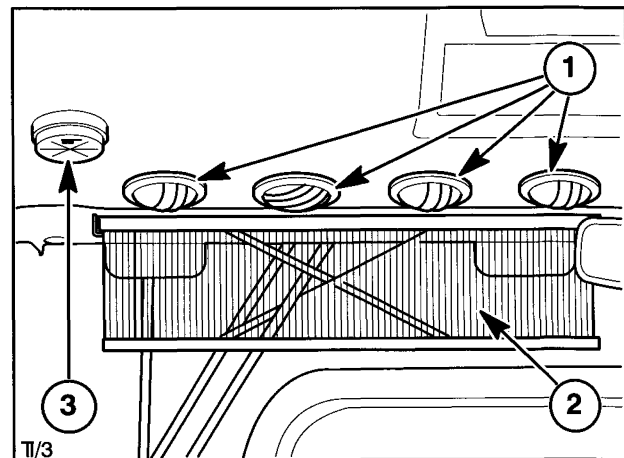
For complete operating instructions, see Section 2.



1-10

Roof-mounted Controls

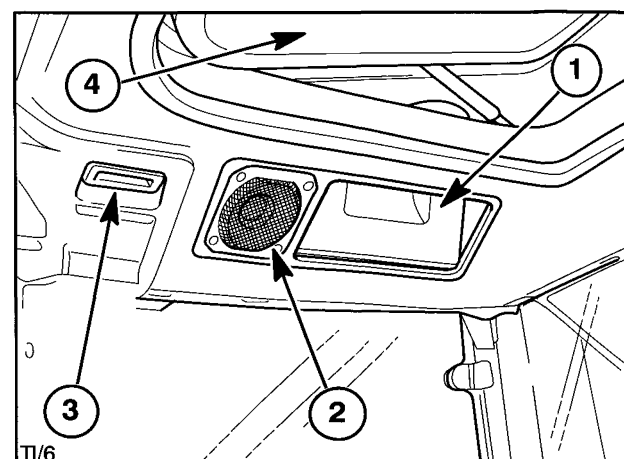
1. Swivelling air vents – press in to open – rotate to direct the air flow.
2. Sun visor
3. Interior light



1-11

Roof-mounted Controls

1. Air recirculation vent – push to open.
2. Radio speaker
3. Console light – illuminates when key-start switch is on.
4. Roof hatch



1-12

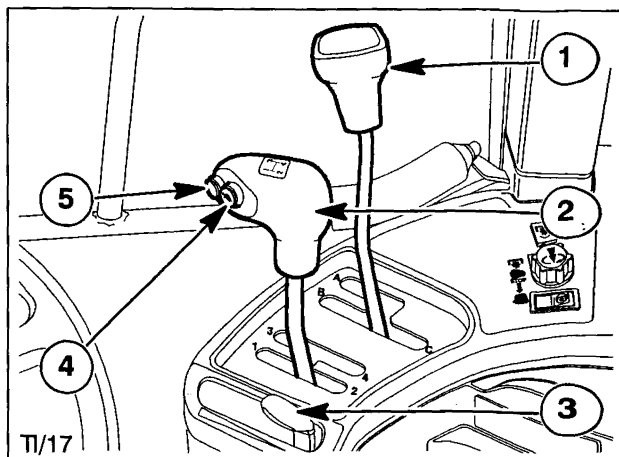
For complete operating instructions, see Section 2.

TRANSMISSION CONTROLS

Controls (23 F x 12 R transmission)

1. Range lever (3 ranges)
2. Main shift lever (4 ratios)
3. Hand throttle lever
4. Underdrive selector button
5. Direct drive selector button

For complete operating instructions, see Section 2.

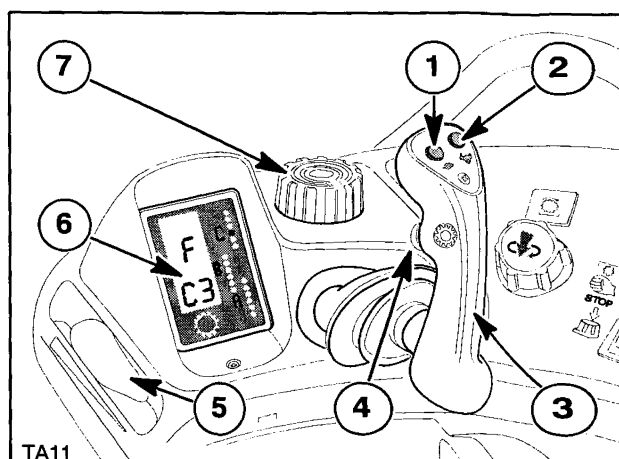


1-13

Controls (18 F/17 F x 6 R transmission)

1. Powershift down button
2. Powershift up button
3. Powershift control (6 ratios)
4. Range change button (3 ranges)
5. Hand throttle lever
6. Gear position display
7. Powershift control adjuster clamp

For complete operating instructions, see Section 2.



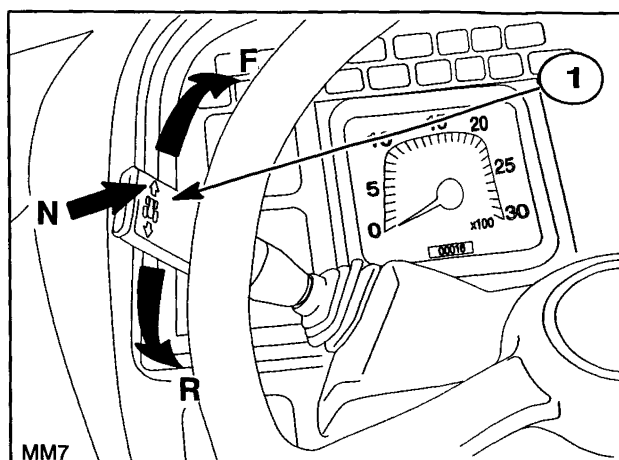
1-14

Controls (forward/reverse lever)

1. Forward/reverse (shuttle) lever – lift and move forward or backwards

F = Forward
N = Neutral
R = Reverse

For complete operating instructions, see Section 2.



1-15

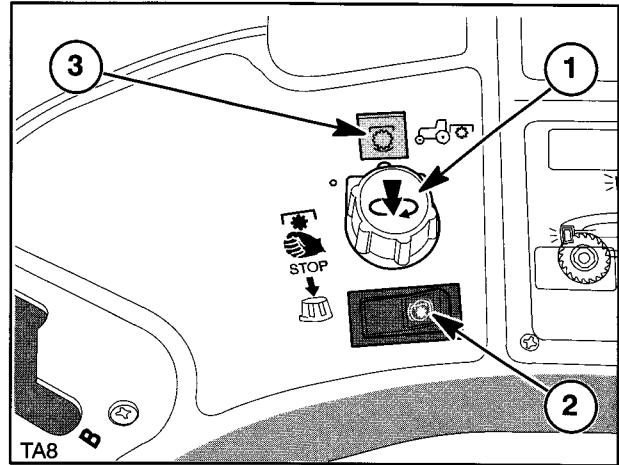
P.T.O. CONTROLS

P.T.O. Controls (right-hand console – front)

Optional front hitch and PTO

1. P.T.O. selector knob – press and rotate.
2. P.T.O. brake override switch
3. P.T.O. indicator lamp

For complete operating instructions, see Section 2.

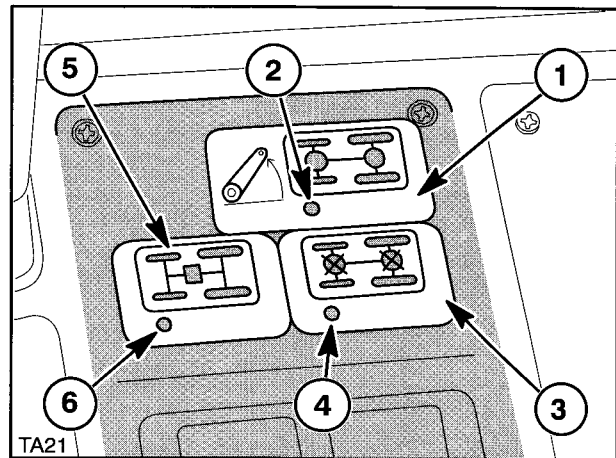


1-16

ELECTRONIC MANAGEMENT UNIT

3-pad Unit (where equipped)

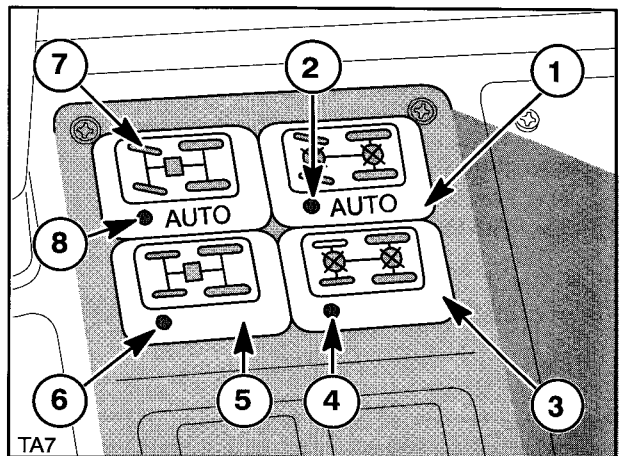
1. Front & rear differential lock switch (semi-automatic mode) – disengages when one brake applied or fast raise/lower switch activated.
2. Indicator lamp
3. Front & rear differential lock switch (manual mode) – disengages when one or both brakes applied.
4. Indicator lamp
5. Front wheel drive switch (manual mode)
6. Indicator lamp



1-17

4-pad Unit (where equipped)

1. Front & rear differential lock switch (automatic mode) – disengages when one brake applied, fast raise/lower switch activated or when steering angle and/or tractor speed exceeds preset limits.
2. Indicator lamp
3. Front & rear differential lock switch (manual mode) – disengages when one or both brakes applied.
4. Indicator lamp
5. Front wheel drive switch (manual mode)
6. Indicator lamp
7. Front wheel drive switch (automatic mode) – disengages when one brake applied or when steering angle and/or tractor speed exceeds preset limits.
8. Indicator lamp



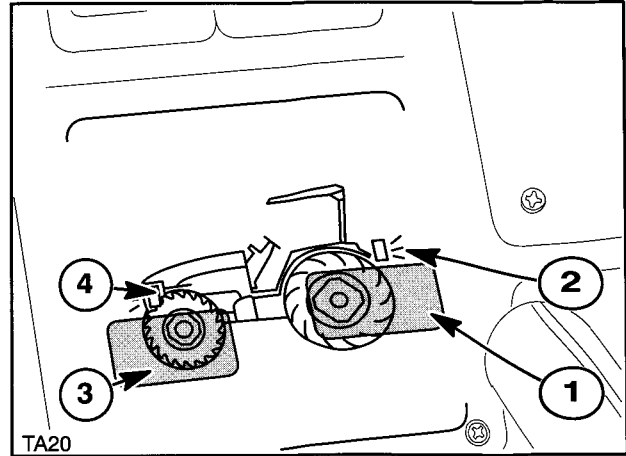
1-18

For complete operating instructions, see Section 2.

WORKLAMP SWITCH PANEL

Switch Panel (tractors less cab)

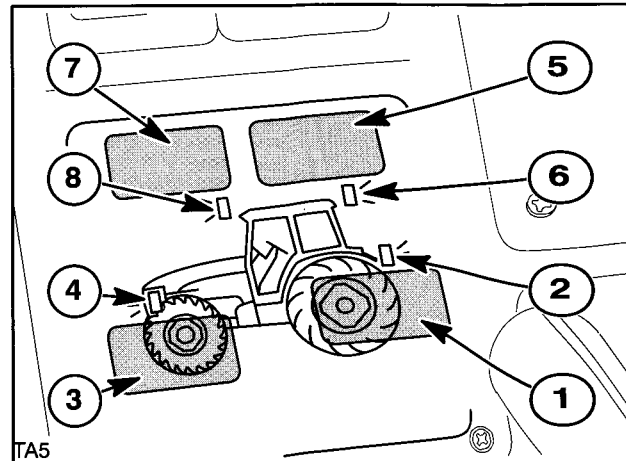
1. Touch pad – rear, fender-mounted worklamp
2. Indicator lamp – rear, fender-mounted worklamps
3. Touch pad – front, grill-mounted worklamps (and grab rail mounted, if equipped)
4. Indicator lamp – front, grill-mounted worklamps (and grab rail mounted, if equipped)



1-19

Switch Panel (tractors with cab)

1. Touch pad – rear, fender-mounted worklamps
2. Indicator lamp – rear, fender-mounted worklamps
3. Touch pad – front, grill-mounted worklamps (and grab rail mounted, if equipped)
4. Indicator lamp – front, grill-mounted worklamps (and grab rail mounted, if equipped)
5. Touch pad – rear, roof-mounted worklamps
6. Indicator lamp – rear, roof-mounted worklamps
7. Touch pad – front, roof-mounted worklamps
8. Indicator lamp – front, roof-mounted worklamps



1-20

For complete operating instructions, see Section 2.

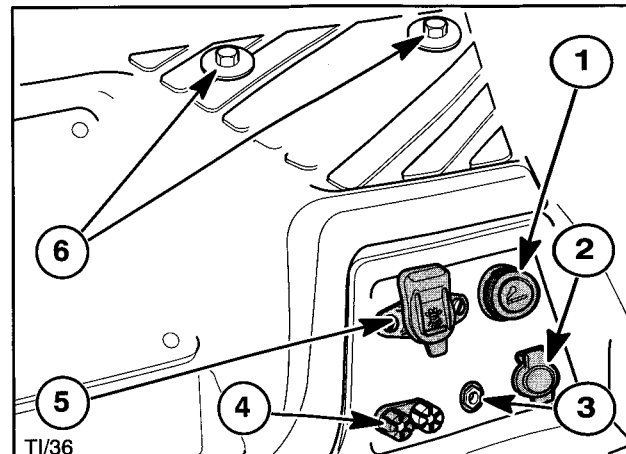
ELECTRICAL ACCESSORY PANEL

Electrical Accessory Panel

1. Cigar/cigarette lighter
2. Live 2-pin, 8 amp socket*
3. Implement status socket
4. Live 2-pin, screw terminals
5. Live 4-pin, 30 amp socket*
6. Implement monitor mounting bolts*

For complete operating instructions, see Section 2.

* Used on less cab tractors



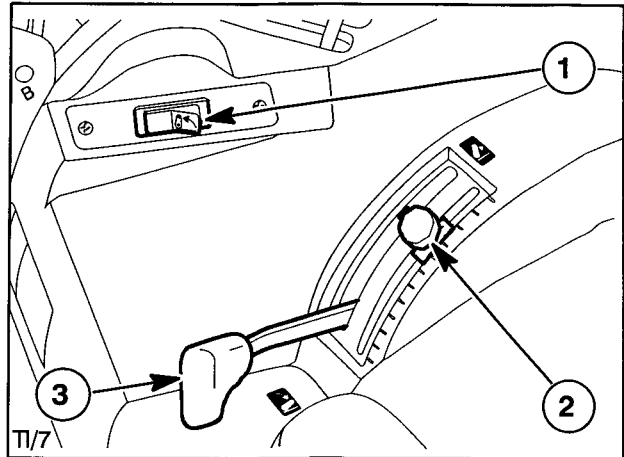
1-21

HYDRAULICS CONTROLS

Hydraulic Controls – Electronic Draft Control

1. Fast Raise/Work switch – press rear to raise 3-point linkage, press front to lower. Center position transfers control to the external, fender-mounted switches.
2. Adjustable stop
3. Lift control lever

For complete operating instructions, see Section 2.

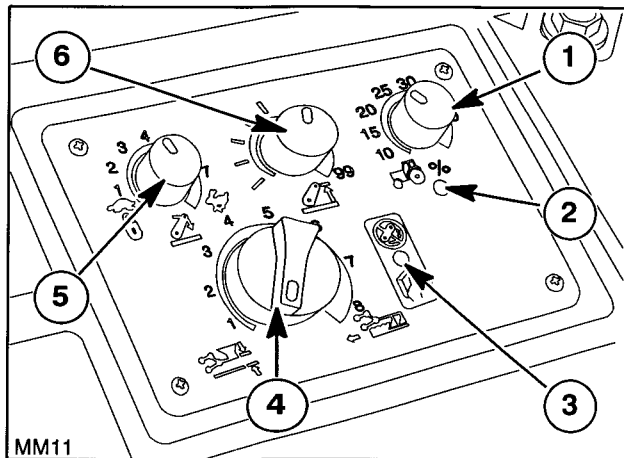


1-22

Electronic Control Panel – Electronic Draft Control

1. Slip limit control knob
2. Slip limit ON indicator light
3. Malfunction/disabled warning light
4. Position/Draft sensitivity knob
5. Drop rate control knob
6. Height limit control knob

For complete operating instructions, see Section 2.

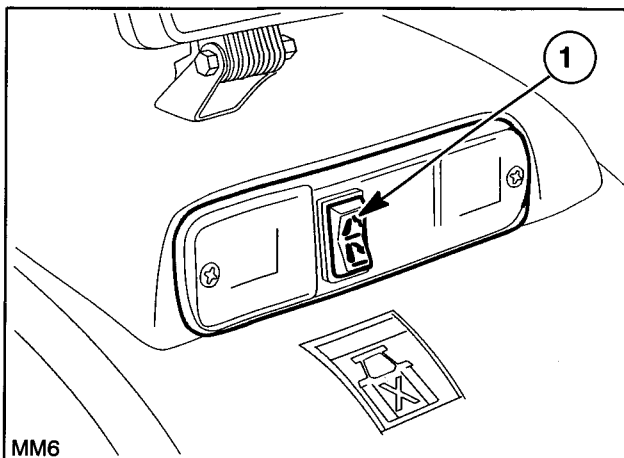


1-23

External Power Lift Control – Electronic Draft Control

1. Fender-mounted raise/lower switch – press top to raise 3-point linkage, press bottom to lower.

For complete operating instructions, see Section 2.

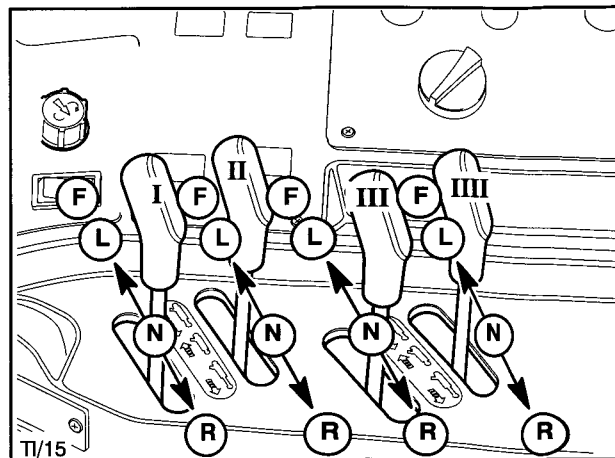


1-24

REMOTE CONTROL VALVES

Remote Control Valve Levers

- F = Float position
- L = Lower position
- N = Neutral position
- R = Raise position



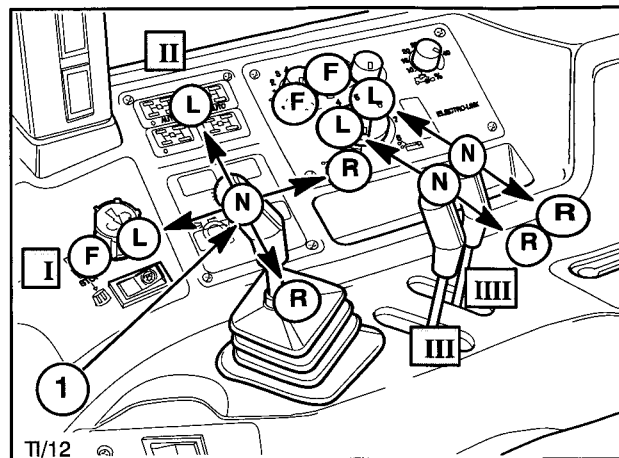
1-25

Remote Control Valve Levers with 'Joystick' Control

1. 'Joystick' control (where equipped)

- F = Float position
- L = Lower position
- N = Neutral position
- R = Raise position

The joystick control actuates remote control valves I and II and is only available when four remote control valves are specified.

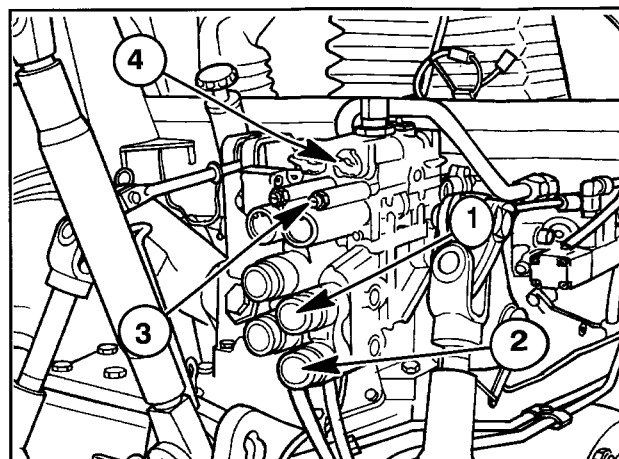


1-26

Remote Control Valves

1. Upper (lift) coupler
2. Lower (drop) coupler
3. Detent adjustment screw
4. Flow control adjustment knob

For complete operating instructions, see Section 2.



1-27

PROTECTING THE ELECTRONIC/ELECTRICAL SYSTEMS DURING CHARGING OR WELDING

PRECAUTIONS

To avoid damage to the electronic/electrical systems, always observe the following:

1. Never make or break any of the charging circuit connections, including the battery connections, when the engine is running.
 2. Never short any of the charging components to ground.
 3. Do not use a jump start battery of higher than 12 volts nominal voltage.
 4. Always observe correct polarity when installing the batteries or using a jump start battery to jump start the engine. Follow the instructions in the operator's manual when jump starting the tractor. Connect positive to positive and negative to negative.
 5. Always disconnect the ground cable from the batteries before arc welding on the tractor or on any implement attached to the tractor.
- Position the welder ground cable clamp as close to the welding area as possible.

- If welding in close proximity to a computer module, then the module should be removed from the tractor. It is recommended that this procedure be done by an authorized dealer.
 - Never allow welding cables to lay on, near or across any electrical wiring or electronic component while welding is in progress.
6. Always disconnect the negative cable from the batteries when charging the batteries in the tractor with a battery charger.



WARNING: Batteries contain sulphuric acid. In case of contact with skin, flush the affected area with water for five minutes. Seek medical attention immediately. Avoid contact with the skin, eyes or clothing. Wear eye protection when working near batteries.

IMPORTANT: Failure to disconnect the two ground cable connections at the battery prior to charging the batteries or welding on the tractor or attached implement will result in damage to the electronic and electrical systems.

TOWING THE TRACTOR

IMPORTANT: The tractor should only be towed a short distance, such as out of a building. Do not tow on roadways or as a method of transport.

IMPORTANT: For transport purposes, haul the tractor with all four wheels on a flat bed trailer or truck.

Use a strong chain when towing the tractor. Tow the tractor from the rear using only the drawbar, or the three-point hitch. Tow the tractor from the front using the tow pin in the front weights or front support. Have an operator steer and brake the tractor.

To avoid damaging the transmission or other components that turn but are not lubricated during towing, observe the following:

- Release parking brake
- Only tow a short distance
- Keep speed below 5 MPH (8 km/h)
- If possible, run the engine to provide lubrication and power steering.



CAUTION: *Do not tow the tractor faster than 5 MPH (8 km/h). Steering is much slower and steering wheel effort is much greater without the engine running.*



WARNING: *Do not use cables or rope to tow the tractor. If the cable or rope breaks or slips, it may whip with sufficient force to cause serious injury.*

When using a chain, attach the chain with the hook open side facing up. If the hook slips, it will drop down instead of flying up.

NOTE: *Front wheel drive will be engaged if the engine is not running, regardless of the position of the FWD activation switch.*

CARRYING THE TRACTOR ON A TRANSPORTER

TRACTOR TRANSPORT

Transport the tractor with all four wheels on a flat bed trailer or truck.

Securely chain the tractor to the transporter.

IMPORTANT: *Do not chain around the four wheel drive shaft, steering cylinders, front wheel drive axle*

or other components that could be damaged by contacting the chain or by heavy loading.

Use the drawbar or drawbar hanger for a rear tie down point.

PRE-OPERATION CHECKS

Before operating the tractor, ensure that you are thoroughly familiar with the location and operation of the controls.

Perform all daily lubrication and maintenance operations in accordance with Section 3.

After completing the daily maintenance operations, perform a walk around visual inspection of the tractor. Pay particular attention to the following items:

- Fan belt for cracks

- Engine area for accumulation of debris
- Hoses, lines and fittings for leaks or damage.
- Tires for damage
- Hardware for looseness
- Driveline and hydraulic pump areas for leaks or dust accumulation

Make any necessary repairs before using the tractor.

SECTION 2

OPERATION

BEFORE OPERATING

Read this section thoroughly. It details the location and operation of the various instruments, switches and controls on your tractor. Even if you operate other tractors, you should thoroughly read this section of the manual and ensure that you are familiar with the location and function of all the features of the tractor.

Do not start the engine or attempt to drive or operate the tractor until you are fully accustomed to all the controls. It is too late to learn once the tractor is moving. If in doubt about any aspect of operation of the tractor, consult your authorized dealer.

Pay particular attention to the recommendations for

running-in to ensure that your tractor will give the long and dependable service for which it was designed.

See Section 3 for lubrication and maintenance requirements. Tractor specifications are listed in Section 5.

NOTE: *The controls on tractors without a cab, from the instrument console down, are very similar to those with a cab. Even if your tractor does not have a cab, you should still read the text relating to the cab to gain an understanding of the function and use of the controls.*

The subjects covered in this section are as listed below. A full index is provided at the end of this book.

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2-6 Cab roof-mounted controls

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2-47 Programming the TPM

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ROLL OVER PROTECTIVE STRUCTURE (ROPS) (where equipped)

The folding ROPS installed on your tractor is designed to be lowered for use in low clearance operations. In Figure 2-1, the ROPS is shown in the normal, upright, operating position. The ROPS is shown folded in the low clearance position in Figure 2-2. The ROPS must be maintained in a serviceable condition.



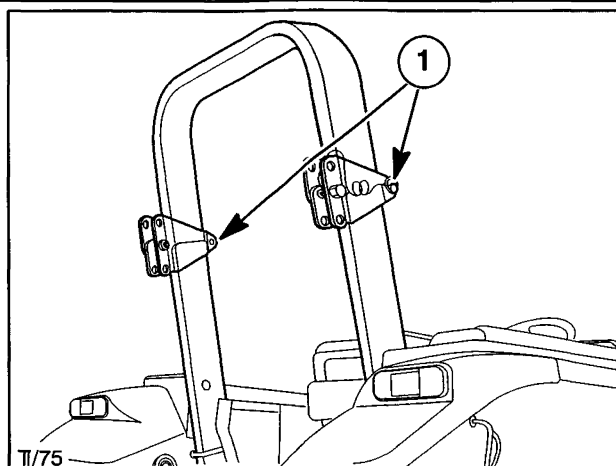
WARNING: When improperly operated, a tractor can roll over. For low clearance use only, the roll bar may be lowered. No protection is provided when the tractor is operated with the roll bar in the lowered position. **Always** raise the roll bar immediately after low clearance use. When the tractor is being driven from a low clearance job, the roll bar should be in the raised position. **Always** use the seat belt when the roll bar is raised. Seat belts save lives when they are used. Do **not** use the seat belt when the roll bar is lowered.

The ROPS is hinged to allow it to be folded rearwards. When in the upright position it is secured by two locking pins (1).

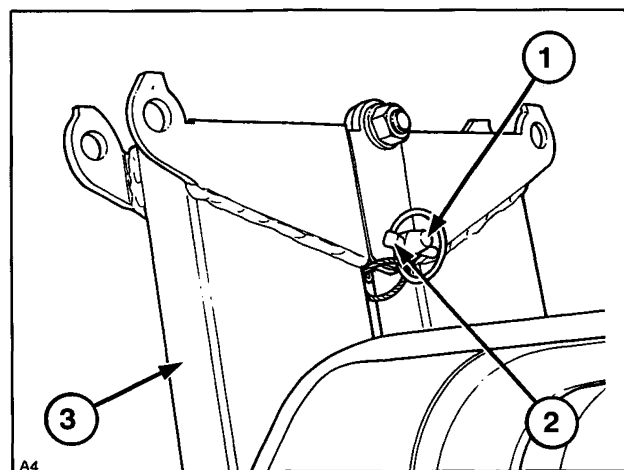
To fold the roll bar to the low clearance position, unclip the linch pin (2) and remove the locking pin (1) from both sides of the roll bar. Lower the upper section of the roll bar (3) rearwards and insert the locking pin in the lower hole, as shown. Secure both locking pins with the linch pins.

If your tractor is fitted with a front end loader, it is recommended that a FOPS canopy (falling object protection system) be installed to protect the operator from falling objects.

NOTE: Do not attempt to fold the ROPS if a canopy is installed.



2-1



2-2



WARNING: Do not attach chains or ropes to the ROPS for pulling purposes since the tractor may tip backwards. Always pull from the tractor drawbar. Be careful when driving through door openings or under low overhead objects. Make sure that there is sufficient overhead clearance for the ROPS. Lower the ROPS, if necessary, but be aware that no protection is provided when the tractor is operated with the roll bar in the lowered position.

CAB (where equipped)

Introduction

The cab has been designed for operator comfort and convenience. Inside, the walls, roof, and floor are insulated to reduce noise to a minimum.

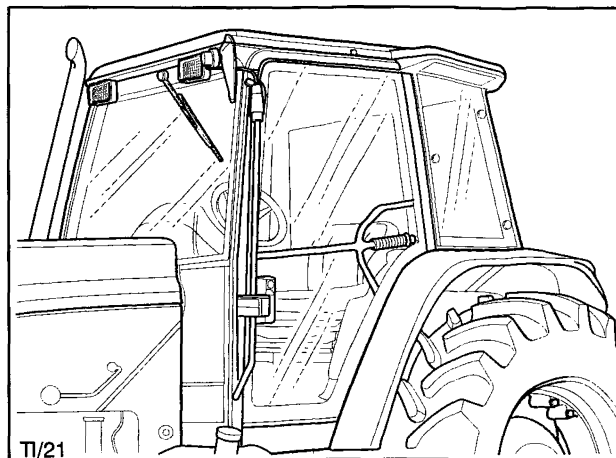
Two wide opening doors permit entry to the cab from either side, aided by convenient grab handles and footsteps with anti-slip treads. The doors and rear window are equipped with gas struts to hold them in the fully open position. Additionally, the windows may be retained in the partially open position for increased ventilation during operation.

Standard cab features include air-conditioning, a fresh air heater/defroster, sun visor, tinted glass, opening side windows, roof hatch, interior light, cigar lighter, ashtray, storage box, interior rear view mirror and a choice of comfortable seats. Options include radio, rear windshield washer/wiper, and extending exterior rear view mirrors.

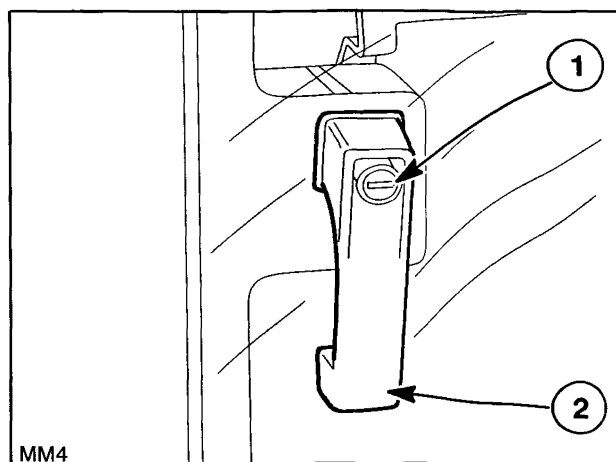
External Door Handle

Each door has an external handle (2) with a push button (1). The door may be locked from the outside using the key provided. Insert the key in the slot in the push button. Rotate the key to lock or unlock the door.

To open a door from the outside, push the button in and pull on the handle.



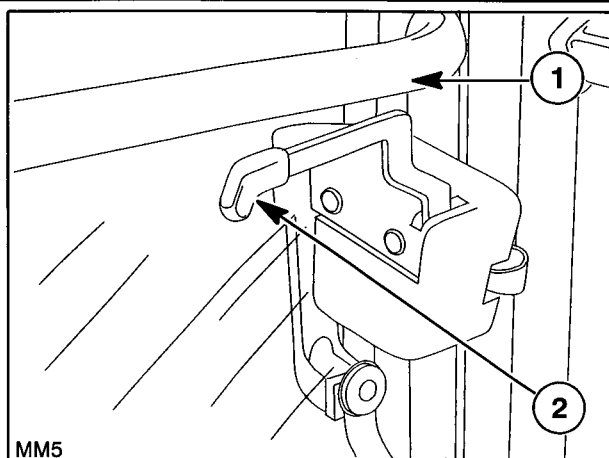
2-3



2-4

Interior Door Handle

To open a door from the inside, lift the door handle (2) and use the grab handle (1) to push the door open. The doors are rear-hinged and are retained in the fully open position by gas struts.



2-5

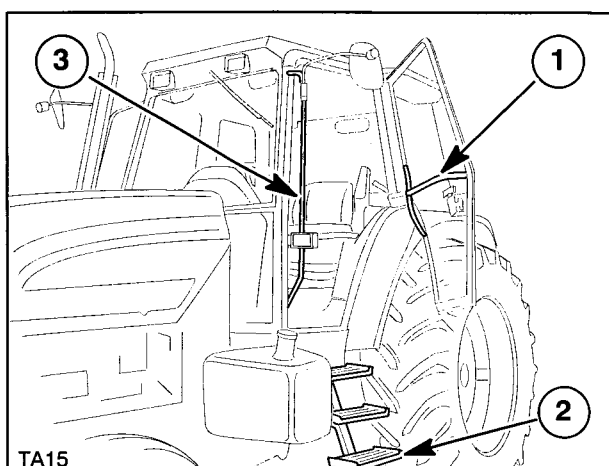
Entering and Exiting the Cab

The cab may be entered from the right or left side.

WARNING: When entering the cab from the right-hand side, use only the grab handles to assist in climbing the steps. If the gear levers are grasped inadvertently, a tractor runaway may result.

To enter the cab, face the door, then open it. Place one foot on the lowest step plate (2) and, using the grab handles on the 'A' post (3) and inside the door (1), climb the steps and enter the cab. Close the door, sit in the seat and fasten the seat belt.

To exit the cab, release the seat belt, open the door, grasp the grab handles, back out of the cab and descend the steps using the grab handles.

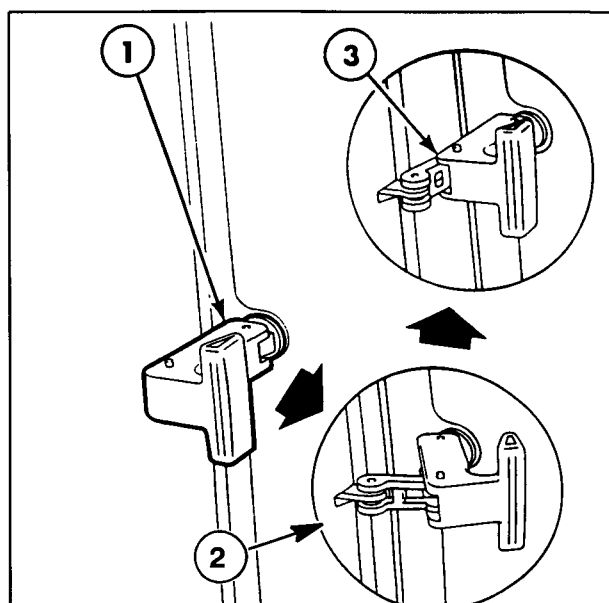


2-6

Side Windows

The windows are hinged at the rear and can be locked in the closed position or retained in the partially open or fully open positions by an over-center mechanism.

To lock the window in the closed position, pull the handle (1) in and forward in an arc until the mechanism locks. To open the window, push the handle out in an arc to position (2) or further out until it locks in position (3).



2-7

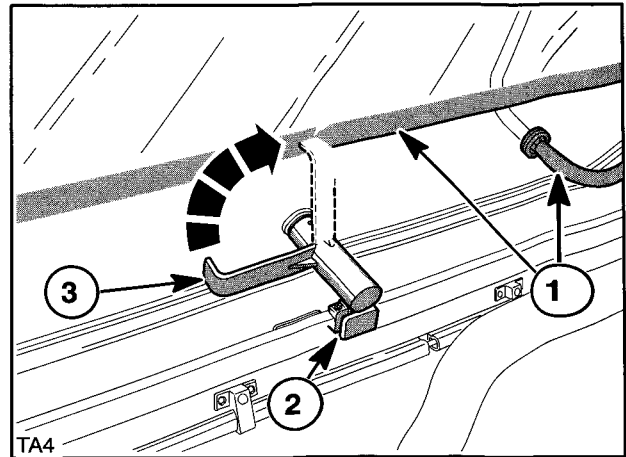
Rear Window

The rear window may be locked in the closed position or retained in the partially open or fully open positions.

To open the window, lift the central locking handle (3) up to the vertical position. Allow the window to open a little then push the handle down so that the locking tongue engages the slot (2) in the frame, as shown. The window may be allowed to swing fully open by the action of two gas-filled struts.

IMPORTANT: *Retain control of the window when opening it fully. Do not allow it to swing open freely.*

To close the window, use the grab handles (1). Push the locking handle, 3, down to lock the window.



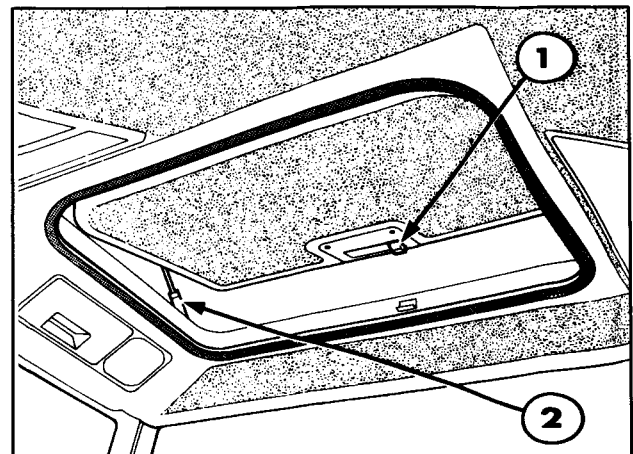
2-8

Roof Hatch

As well as providing increased ventilation in warm weather, the hatch provides an alternative means of leaving the cab in an emergency.

To open the hatch, push the release button (1), forward. Two gas struts (2) will retain the roof in the partially open position, as shown, to provide increased ventilation.

Each strut has a quick-disconnect feature. To fully open the hatch, push firmly upwards. The struts will readily disconnect from the upper pins and permit the hatch to be fully opened.



2-9



WARNING: *Practice opening the hatch so that you are familiar with the quick-disconnect feature.*

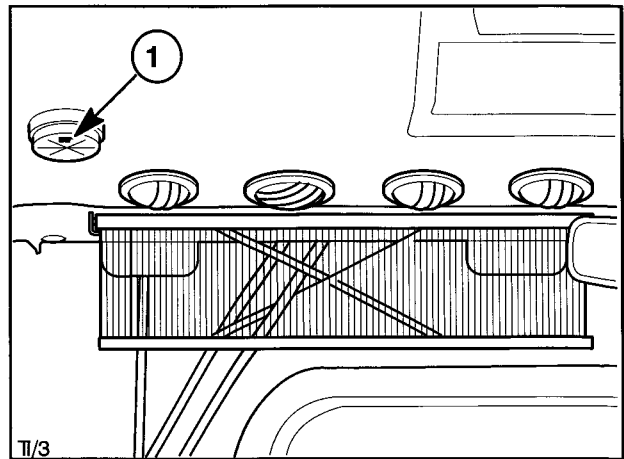
CAB ROOF-MOUNTED CONTROLS

Interior Light

The interior light (1) has a built-in, 3-position switch.

Move the switch to the left to switch on the lamp. When the switch is moved to the right the lamp will illuminate automatically when either of the doors are opened.

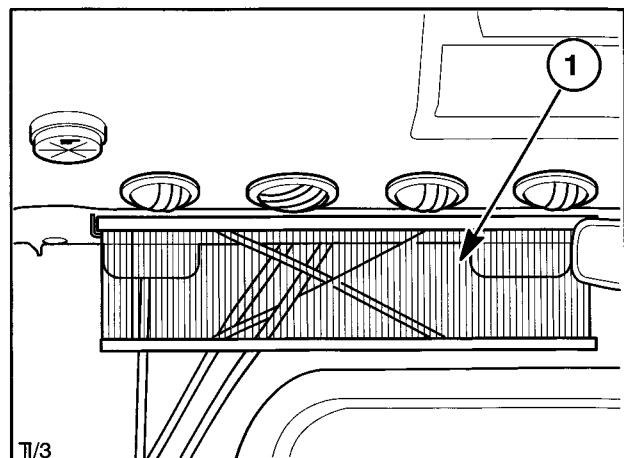
When the switch is in the central position, the light is off.



2-10

Sun Visor

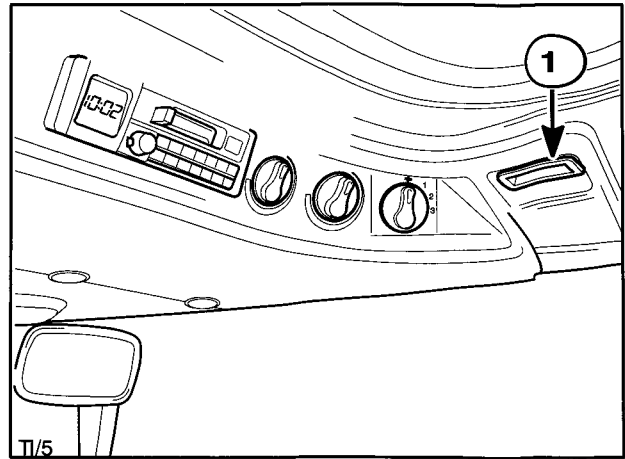
Pull down the sun visor (1) to protect the driver's eyes from the glare of the sun. The visor will remain in the chosen position. Push the visor up to retract.



2-11

Console Light

The light (1) provides a soft, red glow to the gear levers and hydraulic console. A switch is not provided. The light is illuminated when the key-start switch turned on.



2-12

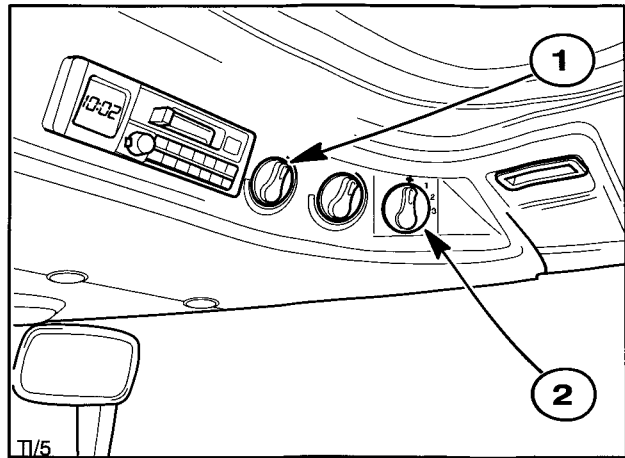
Heater Temperature Control

Turn the knob (1) clockwise to increase the temperature of the air from the heater. Turn fully counter-clockwise to obtain unheated air from the heater vents.

Blower Control

A 3-speed blower is installed for the heater. Turn the switch (2) clockwise to the first position for low speed. Further rotation of the switch in a clockwise direction selects the medium and fast speeds.

With the windows closed, the blower may be used to pressurise the cab to exclude dust. Provided that the cab air filters are serviced correctly, maximum pressurisation and optimum dust exclusion may be achieved by operating the blower with the recirculation vents closed.



2-13

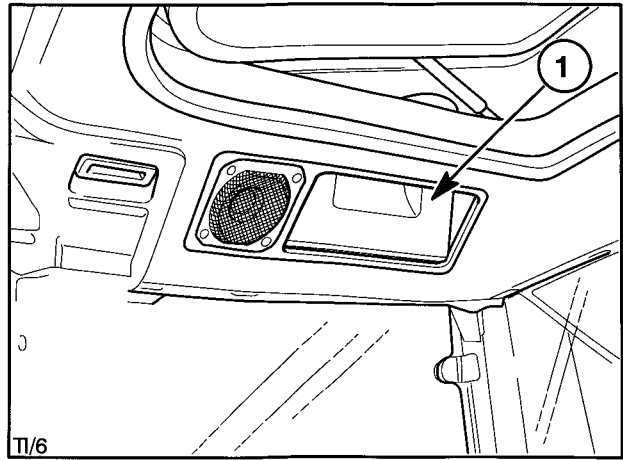
WARNING: *The cab air filter is designed to remove dust from the air but may not exclude chemical vapour. Follow the chemical manufacturer's directions regarding protection from dangerous chemicals.*

Air Recirculation Vents

The heater is of the fresh air type. Two recirculation vents are provided, one on either side of the cab roof panelling, next to the radio speakers.

The recirculation vents (1), when open, as shown, allow the heater blower to draw in air from the cab interior to recirculate through the heating system and provide faster warm-up. To open the vents, push inwards.

With the vents closed, the heater blower will draw in filtered air from outside the cab.

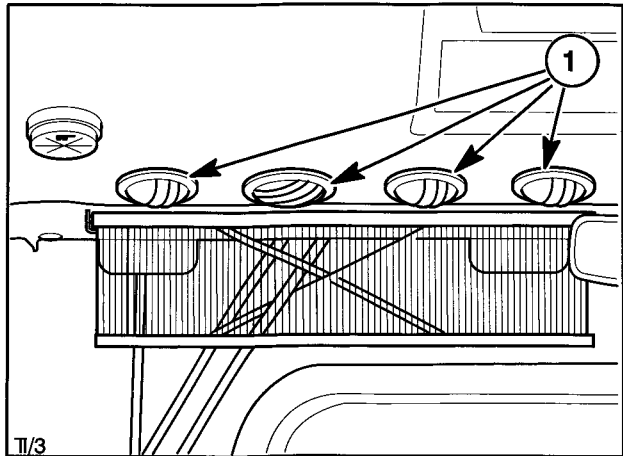


2-14

Swivelling Air Vents

Four swivelling vents (1) are installed in the roof. The vents may be independently adjusted to direct warm or cold air (with the blower control actuated) onto the windshield and side windows or to the cab interior.

To open a vent, press one side of the disc and turn it, as required, to direct the air flow. Move the disc to the horizontal position to close the vent and cut off the air flow.



2-15

Air Conditioner Temperature Control

Rotate the knob (1), clockwise to activate the air conditioner compressor and lower the temperature of the air within the cab. The air conditioner will only operate with the blower (2) switched on. Windows, doors and escape hatch should be closed.

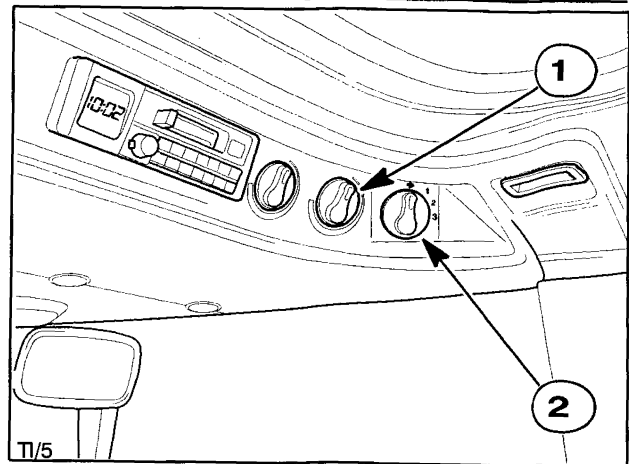
IMPORTANT: *The air conditioning system uses R134A refrigerant. Do **not** mix with other refrigerants.*

If the tractor has been parked in the sun, the interior of the cab may be cooled more quickly if the air conditioner is operated for two or three minutes with the roof hatch partially open. This will force most of the warm air from the cab. Operate the air conditioner at the lowest temperature setting (knob fully clockwise) and at maximum blower speed. When the air has cooled sufficiently, close the hatch and adjust the air conditioner and blower controls to maintain the desired temperature.

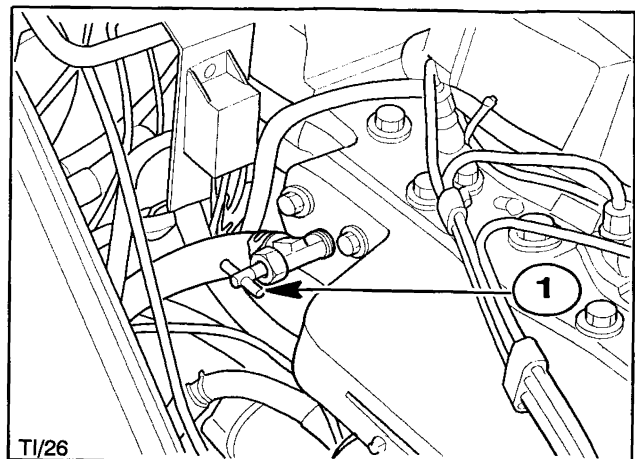
Under certain conditions, it may be desirable to operate both the air conditioner and heater together, e.g. to defrost the windshield and side windows on a cold morning. (The air conditioner, as well as cooling, also removes moisture from the air). Run the engine to normal operating temperature, turn the heater temperature control (3) and blower control (2) to the maximum settings (fully clockwise). Adjust the swivelling air vents to direct the air flow, as required.

When the windows are clear, turn the air conditioner temperature control to the off position and adjust the heater controls to maintain the desired cab air temperature.

NOTE: *At the start of the warm season, when the heater is no longer required, it is recommended that you close the heater shut-off valve (1), at the rear right-hand side of the engine.*



2-16

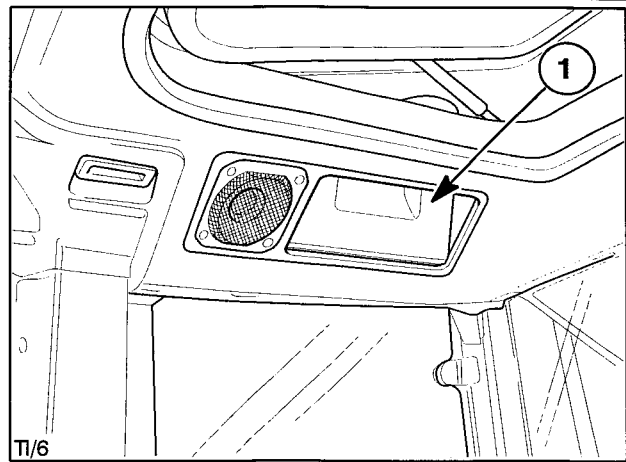


2-17

The air conditioner will operate more efficiently with both recirculation vents (1) open as shown, so as to allow previously cooled air to recirculate.

IMPORTANT: *Run the engine at idle speed for at least 3 minutes after switching on the air conditioner, if the air conditioner has been out of use for more than 30 days.*

IMPORTANT: *Always turn the air conditioner off when cooled or de-humidified air is not required. For proper operation of the air conditioner, ensure that the cab air filters are serviced regularly. See section 3.*



2-18

WARNING: *The refrigerant used in the air conditioner system has a boiling point of 10° F (-12° C).*

- *Never expose any part of the air conditioner system to a direct flame or excessive heat because of the risk of fire or explosion.*
- *Never disconnect or disassemble any part of the air conditioner system. Escaping refrigerant will cause frostbite.*
- *If refrigerant should contact the skin, use the same treatment as for frostbite. Warm the area with your hand or lukewarm water at 90 – 100° F (32 – 38° C). Cover the area loosely with a bandage to protect the affected area and to prevent infection. Consult a doctor immediately.*
- *If refrigerant should contact the eyes, wash the eyes immediately with **cold** water for at least 5 minutes. Consult a doctor immediately.*

NOTE: *It is the normal function of the air conditioner to extract water from the air. Drain hoses lead from the air conditioner unit to a point beneath the cab. Do not be concerned if a pool of water collects beneath the drain hose outlets when the engine is stopped.*

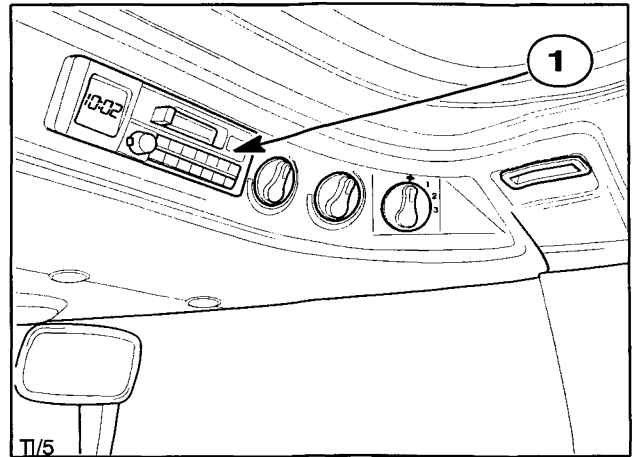
Radio (where equipped)

The cab has two speakers installed in the roof. A choice of AM/FM stereo radios (1) is available as a dealer installed accessory. Separate operating instructions will be supplied with the set.



WARNING: *Ensure the antenna is positioned so it cannot touch overhead power lines.*

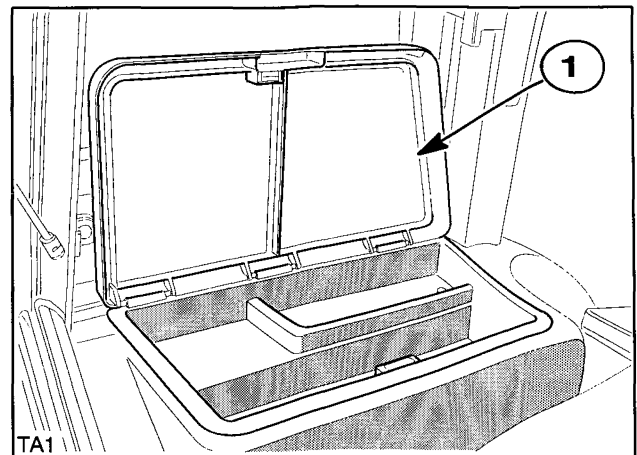
NOTE: *The radio will only operate with the key-start switch in the **on** or **accessories** position.*



2-19

In Cab Storage Box

A storage box with a the hinged lid (1) is located in the rear, left-hand corner of the cab. Lift the lid to access the storage area. The lid is retained in the closed position by a magnetic catch.



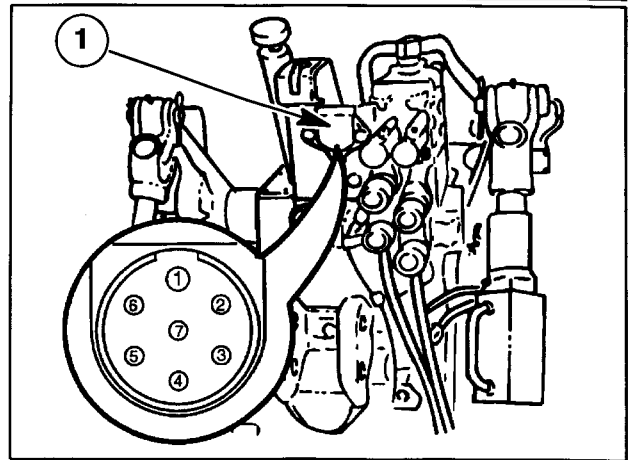
2-20

ACCESSORY SOCKETS AND MONITOR MOUNTING

Seven Pin Auxiliary Connector

A standard SAE seven pin connector, 1, is provided to operate the electrical system on implements and trailers. Pin information is as follows:

PIN NUMBER	CIRCUIT	WIRE COLOR
1	Ground	Black
2	Not used	
3	L Turn Signal	Green/red
4	Not used	
5	R Turn Signal	Green/white
6	Parking Light	Red/black
7	Not used	



2-21

A power panel is provided on the right-hand rear quarter panel housing a variety of optional electrical outlets. With reference to these options are as follows:

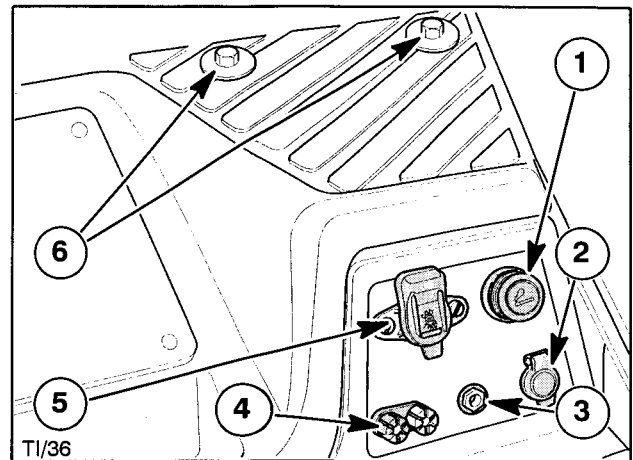
(1) A cigar/cigarette lighter on cabbed tractors. Press the lighter button in to activate. When the lighter element has reached the correct temperature it will pop out ready for use.

(2) A 12-volt single pin power connector. The connector has an 8-amp rating to power electrical monitoring equipment. The connector is activated by the key-start switch.

(3) An implement status socket. Only installed in tractors with electronic instrument consoles (EIC) to enable the area counter to be turned on and off with an implement mounted switch.

(4) A live 2-pin screw terminal on cabbed tractors. The red terminal is positive, the black terminal is negative. Loosen the red or black nut and insert the wire in the hole on the side of the stud. Tighten the nut.

(5) A live, 4-pin, 30 amp socket. See Figure 2-23.



2-22

Monitor Mount Location

Immediately above the power panel, provision is made to mount an implement monitor, utilizing the two bolts (6).

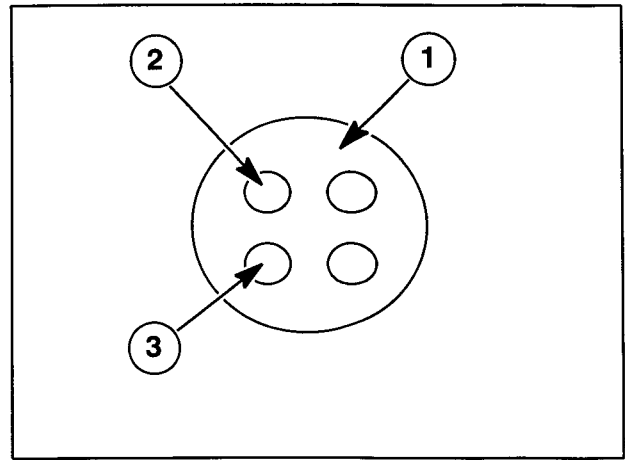
Four Pin Auxiliary Connector

The 12-volt, four pin connector, (1), allows the attachment and operation of electronic control boxes.

Terminal, (2), is powered continually. The terminal has a 30 amp rating.

Terminal, (3), is ground.

NOTE: Mating connectors for the single, four and seven pin connectors are available through your authorized dealer.

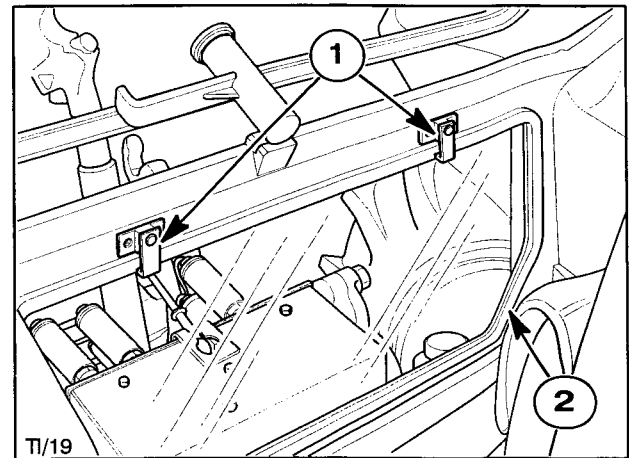


2-23

Cable and Harness Routing

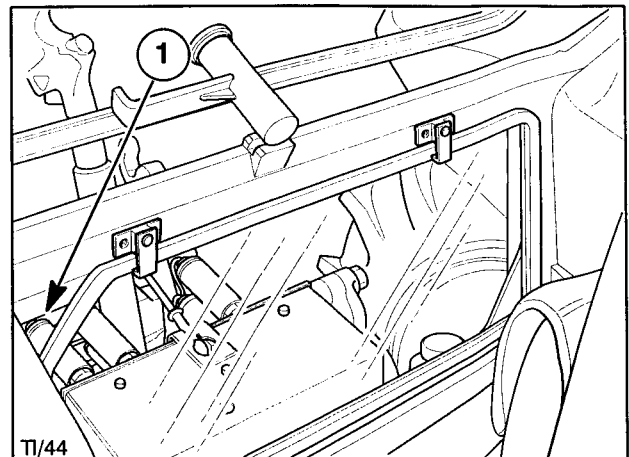
So the operating cable from the monitor may be conveniently routed to the equipment, a small opening is provided in the lower rear window. The window panel has a triangular cut-out (2), which, in the normal position will be in the lower, left-hand corner. In the normal position, the cut-out is masked by the cab frame. If the glass panel is rotated 180° the cut-out will be moved to the upper, right-hand corner.

To rotate the window, rotate the two upper swivel clamps (1) and lift the glass panel from the support brackets.



2-24

Rotate the glass panel 180° and re-install with the cut-out (1), in the upper, right-hand corner and the soft rubber seal facing rearward (toward the cab frame). Secure the panel with the two swivel clamps.

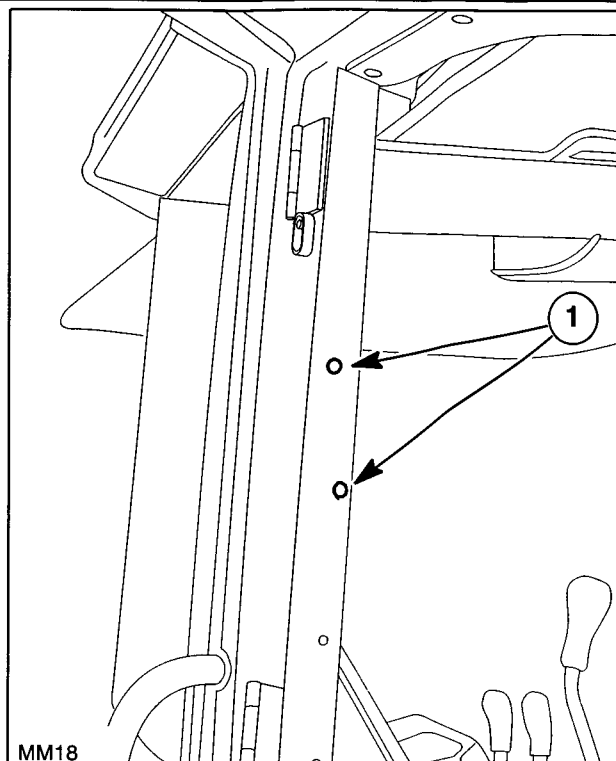


2-25

Monitor Mount Location

An alternative monitor mounting position is provided on the front face of the right-hand 'B' pillar. Remove the plastic trim from the pillar in order to locate the two captive 10 mm nuts (1). Drill holes in the trim in line with the nuts. The nuts are approximately 12.6 and 17.3 in. (320 mm and 440 mm) respectively, from the top of the door frame.

It is recommended that a suitable hinged bracket be screwed to the 'B' pillar to mount the monitor. This will allow the monitor to be swung to one side so as not to impede access to or from the cab.



2-26

CLEANING THE CAB INTERIOR

When the soft trim material inside the cab becomes dirty, it should be wiped clean. Dip a cloth in a warm water/detergent solution and wring out as much of the water as possible.

The rubber floor covering is designed to allow water to flow out through the open doors. Wash the covering carefully and allow to dry naturally. Avoid getting water under the mat.

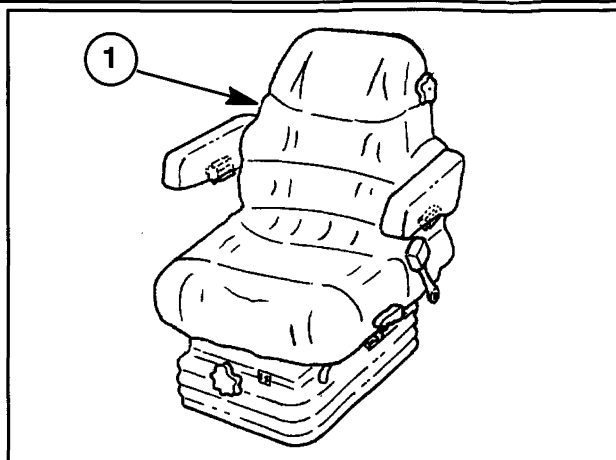
SEATS

The choice of seat available for your tractor will depend upon model and specification level. Whichever seat is installed in your tractor, you will find that it has a comprehensive range of adjustments.

NOTE: *Tractors without cab have vinyl covered seats (1). Tractors with cab have cloth covered seats.*

Before operating the tractor, it is important to adjust the seat to the most comfortable position. All adjustments should be made while seated.

NOTE: *A sensor in the seat detects when an operator is seated. If the operator leaves the seat without applying the parking brake, an audible alarm will sound until the operator returns to the seat, the parking brake is applied, or for a maximum of two minutes. The sensor also actuates the audible alarm for 5 seconds if the operator leaves the seat with the PTO engaged.*

**2-27**

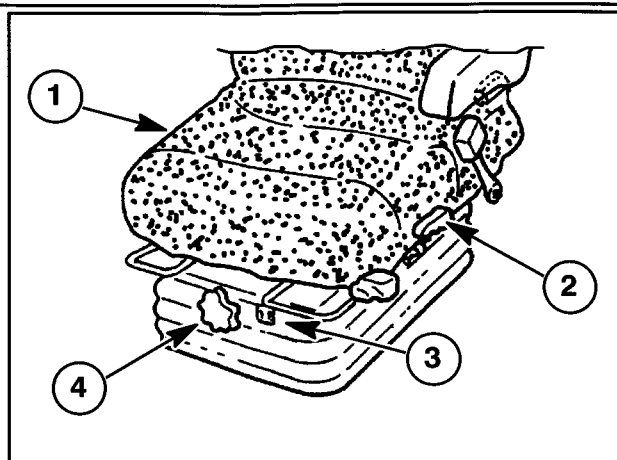
Mechanical Suspension Seat Adjustments

NOTE: All adjustments should be made in the following order while sitting in the seat.

Adjust the seat using the following procedures:

1. Height Adjustment

The seat is adjustable to three different heights. To adjust grasp both sides of the cushion (1) and pull upward. Lifting the seat past the top position will return it to the lowest position.



2-28



CAUTION: The seat is heavy. Assistance may be required to change the seat height.

2. Weight Adjustment

A rotary knob/crank (4) is used to adjust the suspension to operator weight. Pull the crank from the knob and rotate clockwise for increased weight and counterclockwise for decreased weight. A weight indicator (3) displays approximate operator weight in kilograms.

3. Backrest Angle Adjustment

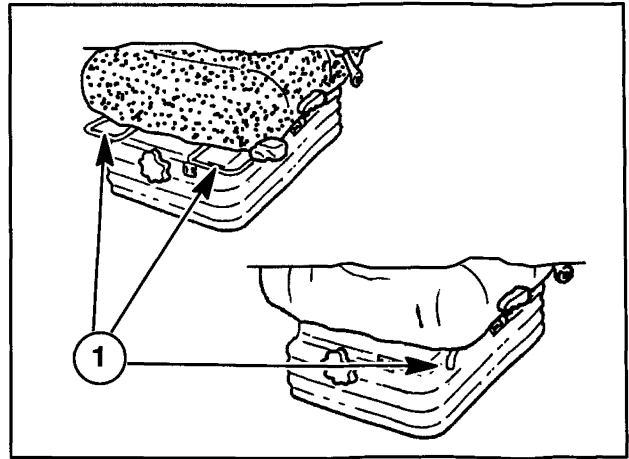
Lift the control (2) and tilt the backrest to the desired position. Release the control to lock the backrest in position.

NOTE: The backrest will tilt backward far enough to contact the rear window.

4. Fore/Aft Position Adjustment

Pull up on the handle (1) and move the seat fore/aft through the 7" (178 mm) adjustment range to the desired position. Release the handle to lock the seat into position.

NOTE: *The vinyl covered seat has one handle only.*



2-29

5. Lumbar Adjustment

Adjust as follows:

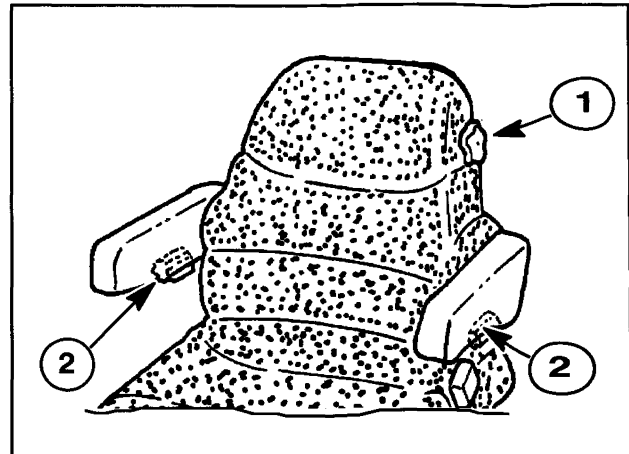
Increase support - Turn knob (1) clockwise

Decrease support - Turn knob counterclockwise

6. Armrest Angle Adjustment

Rotate the knurled wheel (2) on each armrest to adjust to the desired angle.

NOTE: *Both arm rests can be rotated up for additional seat room.*



2-30

7. Swivel Adjustment (except vinyl covered seat)

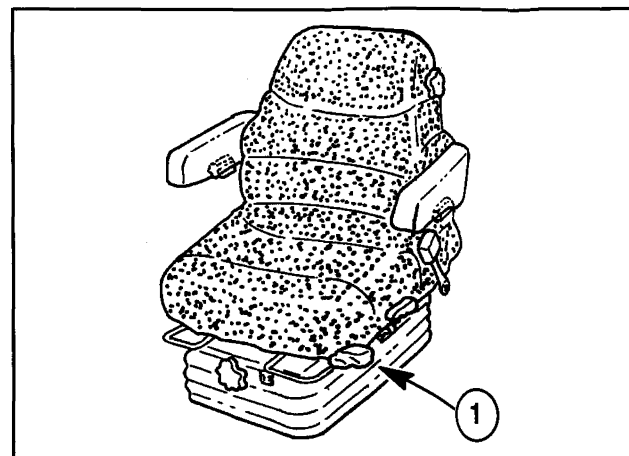
The seat can be adjusted to:

- Lock in one position to the left of center.
- Lock in one of four positions to the right of center (increments of 7° for a total of 28° rotation).
- Provide a free swing position without locking in any position.

To adjust the swivel:

- Move the swivel control handle (1) partially to the rear.
- Swing the seat to the desired position.
- Release the handle to lock the seat into position.

NOTE: *Moving the control handle fully rearward will provide the free swing position.*



2-31

Air Suspension Seat Adjustments

The seat has an electrically controlled pneumatic suspension.

The seat is equipped with controls to permit adjustment for personal comfort. Each control is discussed under the corresponding heading found on the following pages.

NOTE: Before operating the tractor, it is important to adjust the seat, steering wheel and controls to the most comfortable position.

NOTE: All adjustments should be made in the following order while sitting in the seat.

Adjust the seat using the following procedures:

1. Height/Weight Adjustment

Raise or lower the seat as follows with the key-switch in the on position.

Raise - Push the switch in. Release when the desired height is obtained.

Lower - Pull the switch out. Release when the desired height is achieved.

2. Backrest Angle Adjustment

Lift the control and tilt the backrest to the desired position. Release the control to lock the backrest in position.

NOTE: The backrest will tilt backward far enough to contact the rear window.

3. Fore/Aft Position Adjustment

Pull up on the handle and move the seat fore/aft through the 7" (178 mm) adjustment range to the desired position. Release the handle to lock the seat into position.

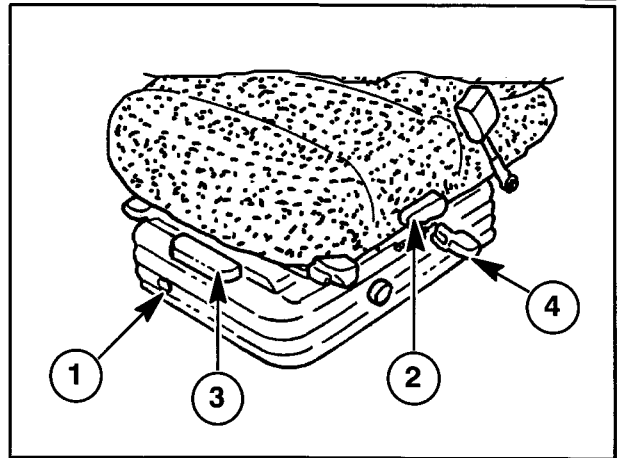
4. Fore/Aft Isolator Engagement

After selecting the desired fore/aft position, the seat can be held stationary or allowed to isolate fore/aft within the 2" (51 mm) limit of the isolator's travel.

Adjust to the desired position as follows:

Isolate - Pull up on the handle.

Lock-out - Push down on the handle while slowly moving the seat fore and aft. The handle will lower in place and the seat will not move when the lock-out position is selected.



2-32

5. Dampener Adjustment

The firmness of the ride can be adjusted as follows:

Soft - Rotate control knob (1) rearward.

Firm - Rotate control knob forward.

6. Swivel Adjustment

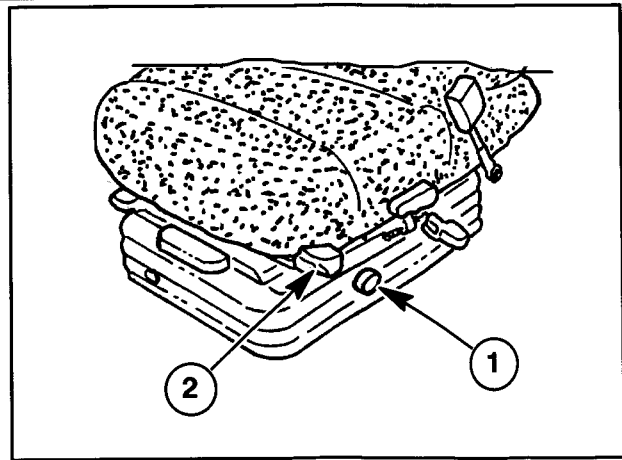
The seat can be adjusted to:

- Lock in one position to the left of center.
- Lock in one of four positions to the right of center (increments of 7° for a total of 28° rotation).
- Provide a free swing position without locking in any position.

To adjust the swing:

- Move the swivel control handle (2) partially to the rear.
- Swing the seat to the desired position.
- Release the handle to lock the seat into position.

NOTE: Moving the control handle fully rearward will provide the free swing position.



2-33

7. Lumbar Adjustment

Adjust as follows:

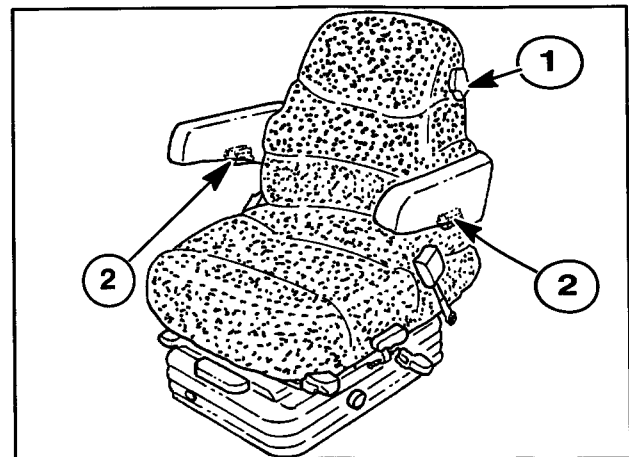
Increase support - Turn knob (1) clockwise

Decrease support - Turn knob counterclockwise

8. Armrest Angle Adjustment


Rotate the knurled wheel on each armrest to adjust to the desired angle.

NOTE: Both armrests (2) can be rotated up to gain additional seat room.



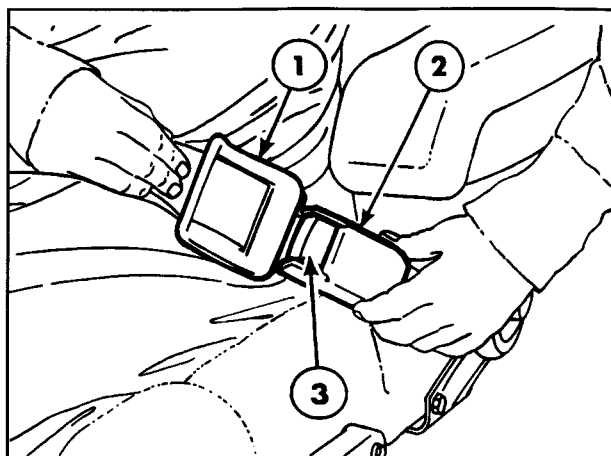
2-34

Seat Belt

 **WARNING:** All tractors are equipped with a safety cab or ROPS and a retractable seat belt. Always use the seat belt.

To fasten the belt, pull the belt from the reel and push the tongue (1) into the buckle end (2) until a 'click' indicates it is properly engaged. Press the red release button (3) on the buckle and remove the tongue from the buckle.

The belt may be sponged with clean, soapy water. Do not use solvents, bleach or dye on the belt as these chemicals will weaken the webbing. Replace the belt when it shows signs of fraying, damage or general wear.

**2-35**

PARKING BRAKE AND FOOT CONTROLS

Parking Brake

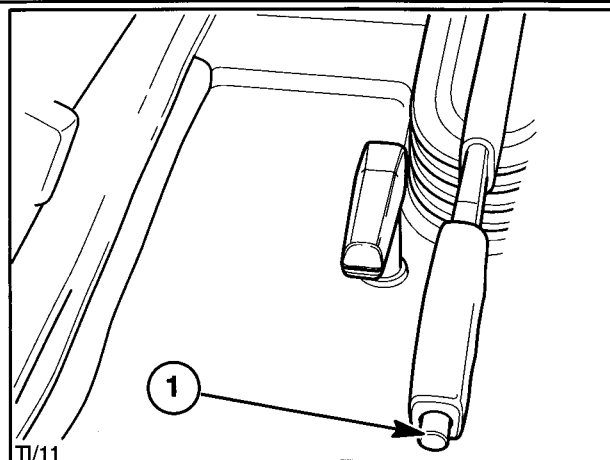
A parking brake lever is installed to the left of the driver's seat.

To apply the parking brake, pull the lever up. To release, ease the lever up further, depress the button (1) on the end and lower the lever fully.

IMPORTANT: *Ensure that the handbrake is fully released before driving off.*

NOTE: *A two minute alarm will sound if the parking brake is not applied when the operator leaves the seat.*

NOTE: *Front wheel drive will be engaged whenever the parking brake is applied.*

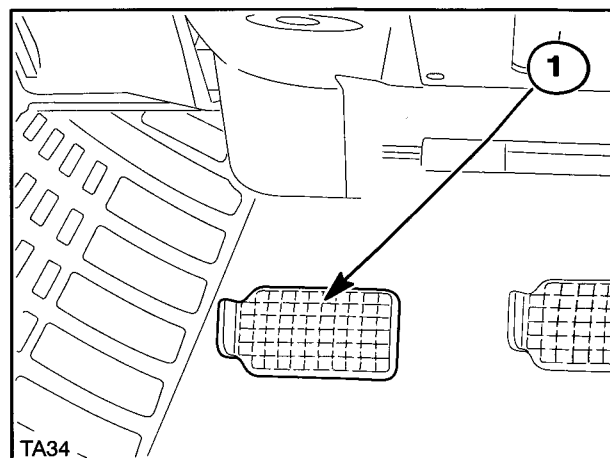


2-36

Clutch/Inching Pedal

When the clutch pedal (1) is depressed the drive between the engine and transmission will be disengaged. Use the pedal to transfer engine power smoothly to the driving wheels when moving off from a standstill. See 'TRANSMISSION' later in this section for further details.

NOTE: *To avoid premature wear, do not use the clutch pedal as a footrest.*

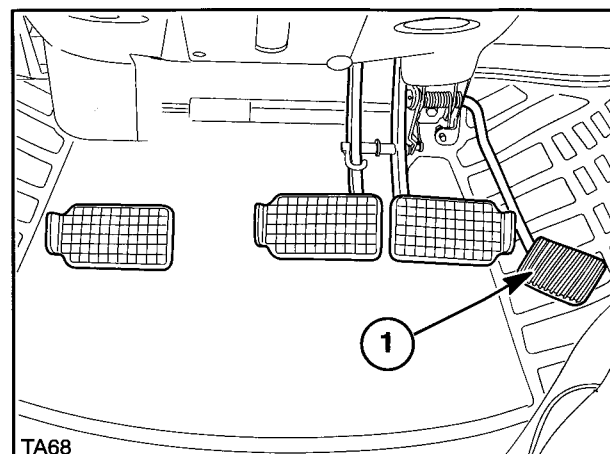


2-37

Foot Throttle

The foot throttle (1) may be used independently of the hand throttle to control the speed of the tractor. It is recommended that you use the foot throttle when driving on the highway.

NOTE: *When the foot throttle is released, engine speed will reduce to the level set by the hand throttle. When using the foot throttle, set the hand throttle to the minimum speed position (lever fully rearward).*

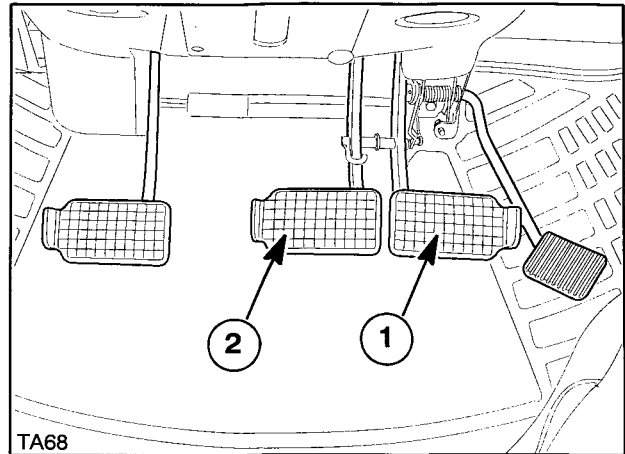


2-38

Footbrakes

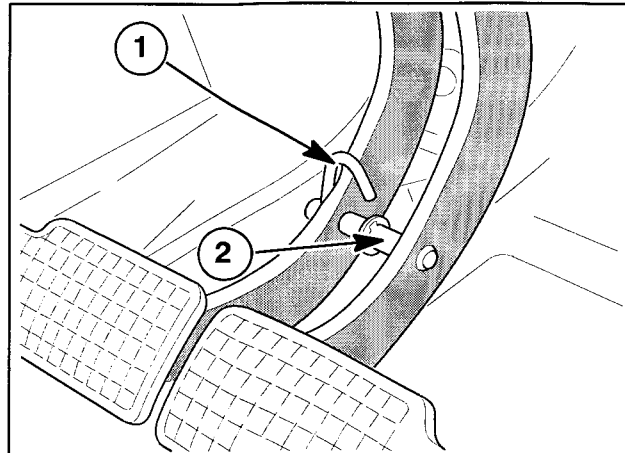
The brakes are actuated by two footpedals (1) (right) and (2) (left). They may be operated independently, to aid turning in confined spaces or locked together for normal stopping. When operating in the field, the brake pedals may be unlocked, as shown. However, due to the close proximity of the pedals to one another, it is still possible to apply both brakes together, when required.

WARNING: On front wheel drive tractors, the drive to the front axle is automatically engaged when the brakes are applied to provide four wheel braking. Operator's should be aware of the effectiveness of four wheel braking which greatly enhances braking performance. Appropriate care should be exercised during heavy braking.



2-39

WARNING: For your safety, always lock the brake pedals together when travelling at transport speeds or if a hydraulically braked trailer is attached to the tractor. To lock the pedals together, slide the bolt (2) to the left, to engage the hole in the left-hand pedal shank and push the hooked end (1) down, as shown, to engage the right-hand pedal shank.



2-40

INSTRUMENT CONSOLE

The following text describes the use of the various switches and controls, etc., mounted on the instrument console and steering column.

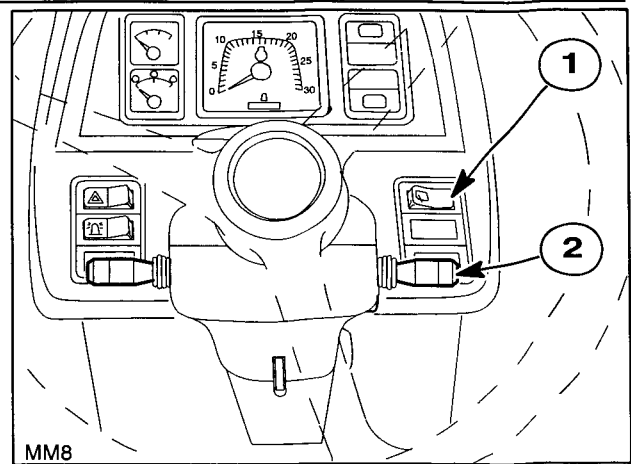
Rear Window Wipe/Wash Control (if equipped)

When the key-start switch is turned on, the rocker switch will be internally illuminated.

The rocker switch (1) has three positions. Press the left-hand side of the switch in to the first position to actuate the rear wiper. Press fully in, against spring pressure, to actuate the washer motor.

With the right-hand side pressed in, the wiper and washer are switched off.

NOTE: *The rear window washer jet is mounted in the center of the cab frame, immediately beneath the rear of the roof. Insert a pin into the jet nozzle to adjust the angle of the jet.*



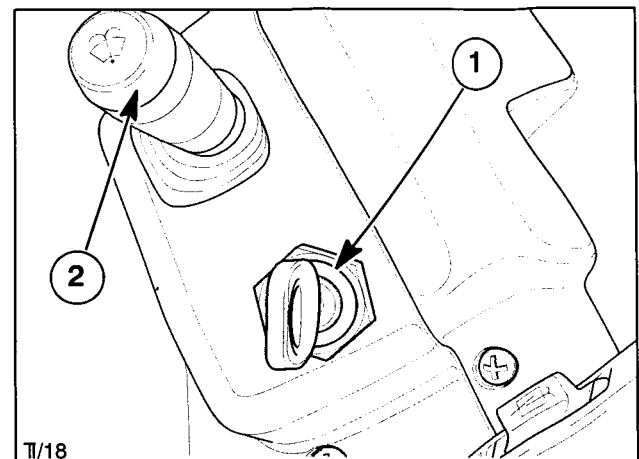
2-41

Front Windshield Wipe/Wash Control

The stalk-type control (2) on the right-hand side of the steering column controls the front windshield wiper and washer.

With the key-start switch on, move the stalk rearward to operate the slower of the two wiper speeds. Move the stalk fully rearward and the higher wiper speed will be selected. Press in the end of the stalk, against spring pressure, to operate the electric washer.

NOTE: *The windshield washer jet is mounted in the center of the cab frame, immediately beneath the front of the roof. Insert a pin into the jet nozzle to adjust the angle of the jet.*



2-42

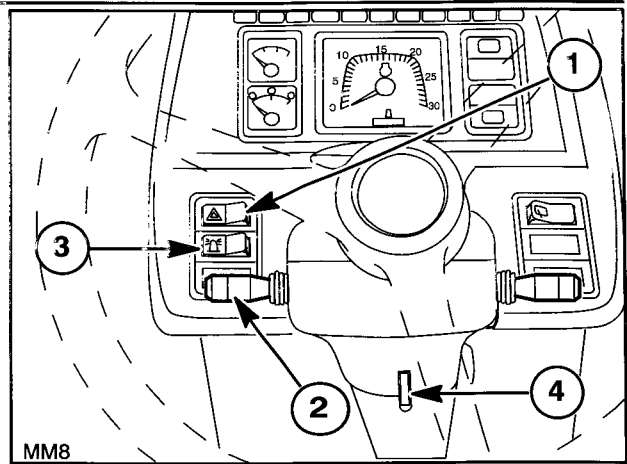
Key-start Switch

The key-start switch (1) activates the Thermostart cold start device and the starting motor and accessory circuits. See 'Starting the Engine' in Section 2.

Steering Column Clamp Lever

The steering column may be tilted and telescoped if the clamp lever (4) is released. Pull the lower end of the clamp lever up (toward you). The steering column will become free. Move the steering column to the most convenient position and push the clamp lever forward (into the recess in the steering column cover) to lock the steering column assembly.

IMPORTANT: Your tractor is equipped with hydrostatic power steering. Never hold the steering wheel at full left or right lock (wheels against the steering stops) for more than 10 seconds. Failure to observe this precaution may result in damage to steering system components.



2-43

Hazard Warning Lights Switch

Press the left side of the switch (1) to operate all the turn signals simultaneously. The switch will flash in unison with the turn signals. Press the right side to turn the lights off.

Multi-function Switch

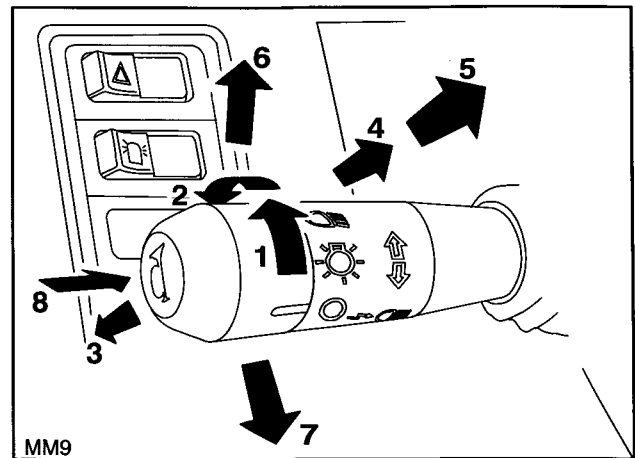
The stalk-type switch shown at (2) Figure 2-43, is mounted on the left-hand side of the steering column. The switch operates the tractor lights, horn and turn signals as follows.

Rotate the stalk forward to the first position (1) to turn on the tractor side lights and instrument lights. Rotate the stalk to the second position (2) to turn on the headlights. With the headlights switched on, push the stalk down (position 3) to select high beam, pull up (position 4) for low beam. Pull the stalk further up, against spring pressure (to position 5) to flash the headlight. The headlight flash will function with the tractor lights on or off.

To operate the right-hand turn signals, move the stalk forward to position (6). The left-turn signals will operate if the stalk is pulled rearward to position (7). The turn signal indicator lights on the instrument panel will also flash when the turn signals are actuated.

NOTE: The turn signals will only operate with the key-start switch turned on.

Press in the end of the stalk (8) to sound the horn.



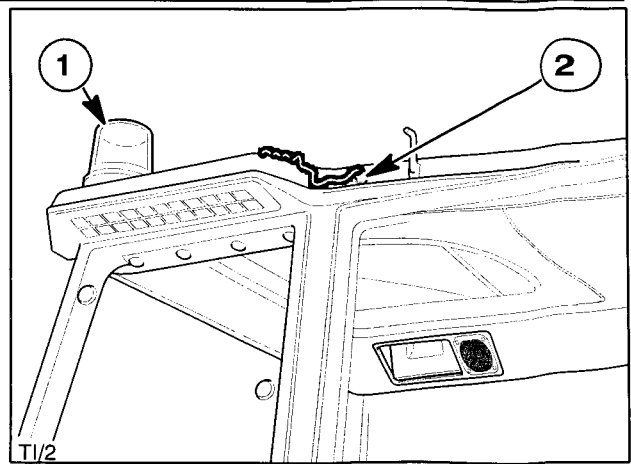
2-44

Roof Beacon (accessory on cabbed tractor)

Press in the left side of the rocker switch (3) Figure 2-43, to provide power to the roof beacon socket outlet. Press the right side of the switch to turn off.

The roof beacon kit consists of a rotating beacon (1) with a magnetic base, a steel plate and a switch. The cab roof is made from fibreglass. Four depressions are provided in the roof panel to accommodate the steel plate which should be attached into one of the depressions with the screws provided. The beacon may then be attached magnetically to the steel plate.

A socket (2), connected to the tractor electrical circuit, is provided on either side of the roof panel. The rotating beacon may be plugged into one of the sockets, as shown.



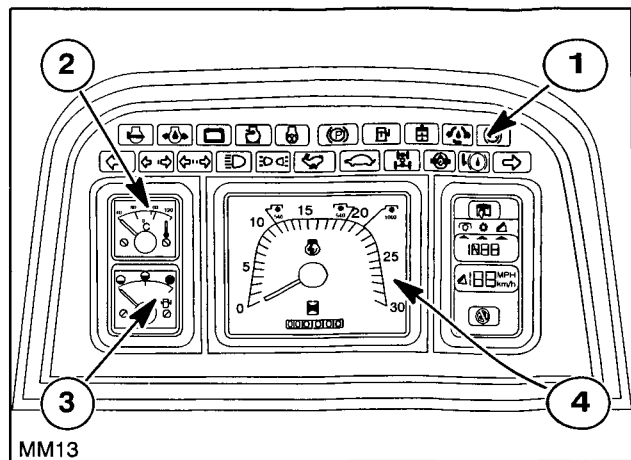
2-45

ANALOG INSTRUMENT CONSOLE

Two types of instrument panels are available, dependent upon model and specification level. The analog electronic instrument console and Figure 2-56 shows the full electronic instrument console.

The upper section of both instrument panels consists of 21 colored lights (1) which provide operating information or give warning of system malfunction.

The analog electronic instrument console has instrument panel, three analogue gauges (2), (3) and (4). The panel has in addition, a liquid crystal display (LCD) on the right-hand side with two additional warning lights.



2-46

The instruments and liquid crystal display area are illuminated when the tractor lights are turned on. The instrument panel is also equipped with an audible alarm.

GAUGES

Engine Coolant Temperature Gauge

The temperature gauge (2) indicates the temperature of the engine coolant. If the needle enters the right-hand (red) section of the gauge while the engine is running, stop the engine and investigate the cause.

Fuel Gauge

The gauge (3) indicates the level of fuel in the tank(s) and is only operative with the key-start switch turned on.

Proofmeter

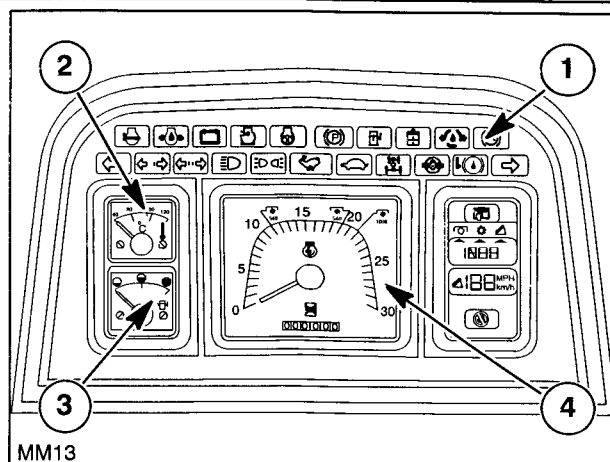
The proofmeter (4) consists of a tachometer and hourmeter. The tachometer indicates engine revolutions per minute. Each division on the scale represents 100 rev/min., therefore with the needle indicating '20' the engine is running at 2000 rev/min.

There are three P.T.O. symbols on the tachometer scale. The white '540' P.T.O. symbol (1) indicates the engine speed at which a P.T.O. speed of 540 rev/min is obtained.

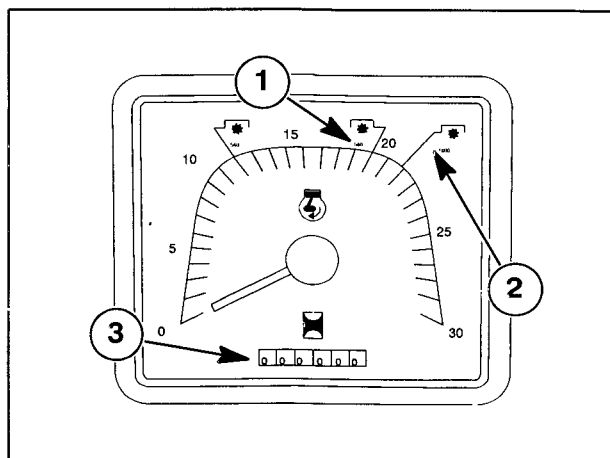
The yellow '540' symbol is not used in North America.

The white '1000' symbol (2) indicates the engine speed at which the 1000 rev/min P.T.O. speed is obtained.

The hourmeter (3) records the total number of hours that the tractor has operated. The hours recorded should be used as a guide to determine hourly servicing intervals. (See section 3 of this Manual).



2-47



2-48

Liquid Crystal Display (LCD)

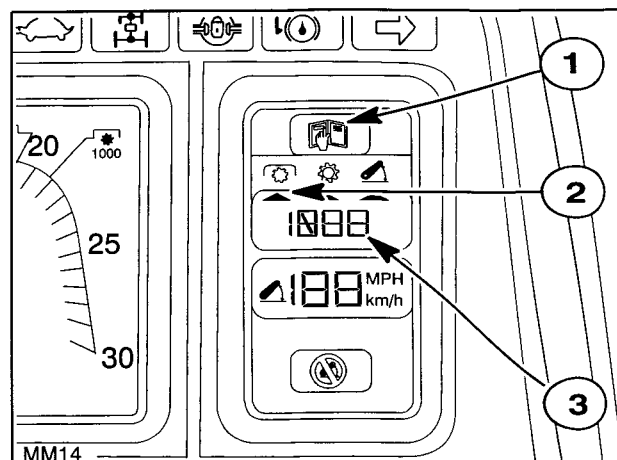
The right-hand panel is split into two separate displays, each having a warning light and an LCD. All the displays are shown activated, for reference purposes. See the following text.

Upper Digital Display

When the P.T.O is operating, the arrow symbol (2), pointing to the P.T.O. symbol, will display together with a digital display of the rear P.T.O. shaft speed in the upper LCD (3). See 'Power Take Off' later in this section.

When the P.T.O. is disengaged the display will change to advise the operator of the position of the 3-point linkage (and implement) by means of numbers ranging from '0' (fully lowered position) to '99' (maximum lift height). The display also shows EDC error codes. See 'Electronic Draft Control' on page 2-79.

If your tractor has a 23 F x 12 R transmission, the upper LCD will also automatically display transmission error codes. Should an error code appear then the malfunction warning light (1) will also illuminate. See 'Malfunction Warning Light' on the next page. The upper LCD is also used to display diagnostics and calibration information for the EDC, Electronic Management Unit (EMU) and transmission.

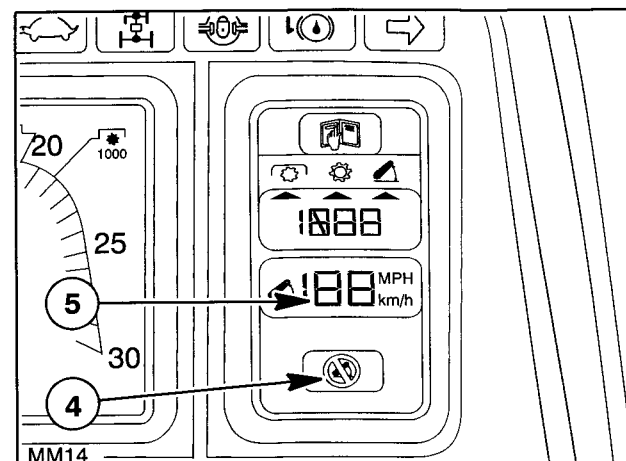


2-49

Lower Digital Display

The hitch disabled warning light (4) will illuminate when the 3-point linkage position is out of phase with the hydraulic lift control lever. See 'Electronic Draft Control' on page 2-79.

The lower LCD (5) provides a permanent display of ground speed in MPH or km/h. The display may be changed by using the switches on the electronic management unit adjacent to the right-hand window.



2-50

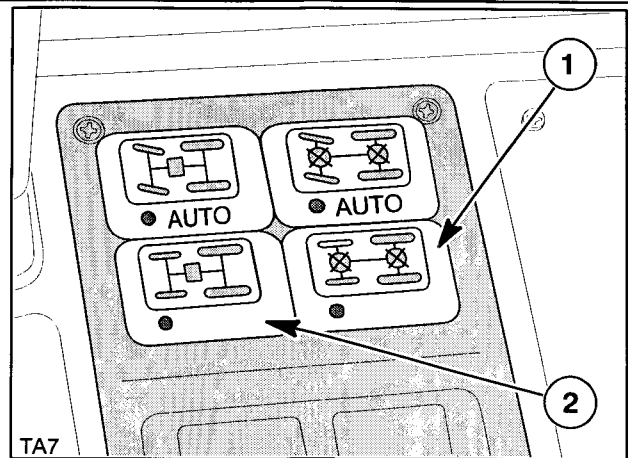
To change from MPH to km/h

Turn the key-start switch on while holding down the manual differential lock touch pad (1).

To change from km/h to MPH

Turn the key-start switch on while holding down the manual four wheel drive touch pad (2).

NOTE: The four pad unit is shown. Some models will have a unit with only three touch pads, but the two lower pads are still used to change from MPH to km/h and vice versa, as described above.



2-51

Malfunction Warning Light and Alarm

In the unlikely event that a fault occurs in an electrical circuit, the malfunction warning light (1) will flash for approximately 5 seconds accompanied by an error code in one of the LCD's (2) or (3).

Malfunctions are classified into two categories:

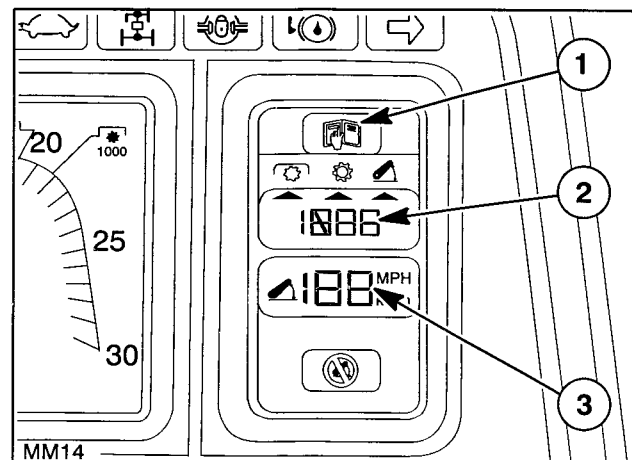
Critical

Non-critical.

A critical fault will stop the tractor and the error code and warning light will continue to flash until the fault is corrected or the key-start switch turned off.

A non-critical fault will cause the error code and warning light to flash for approximately 5 seconds. The tractor may continue to be operated until it is convenient to correct the fault.

Every time the key-start switch is turned on, the malfunction warning light and error code will flash for a short period.

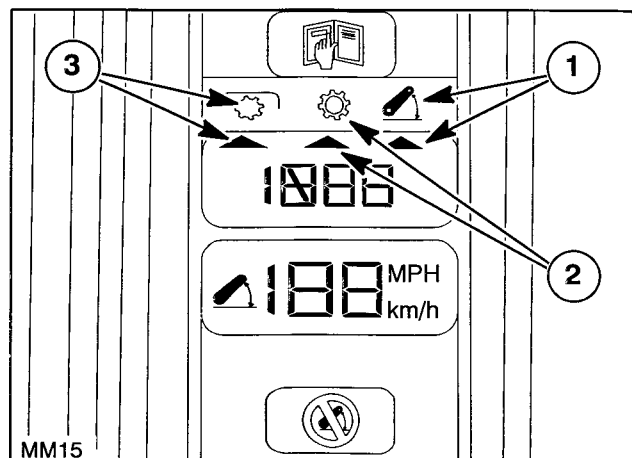


2-52

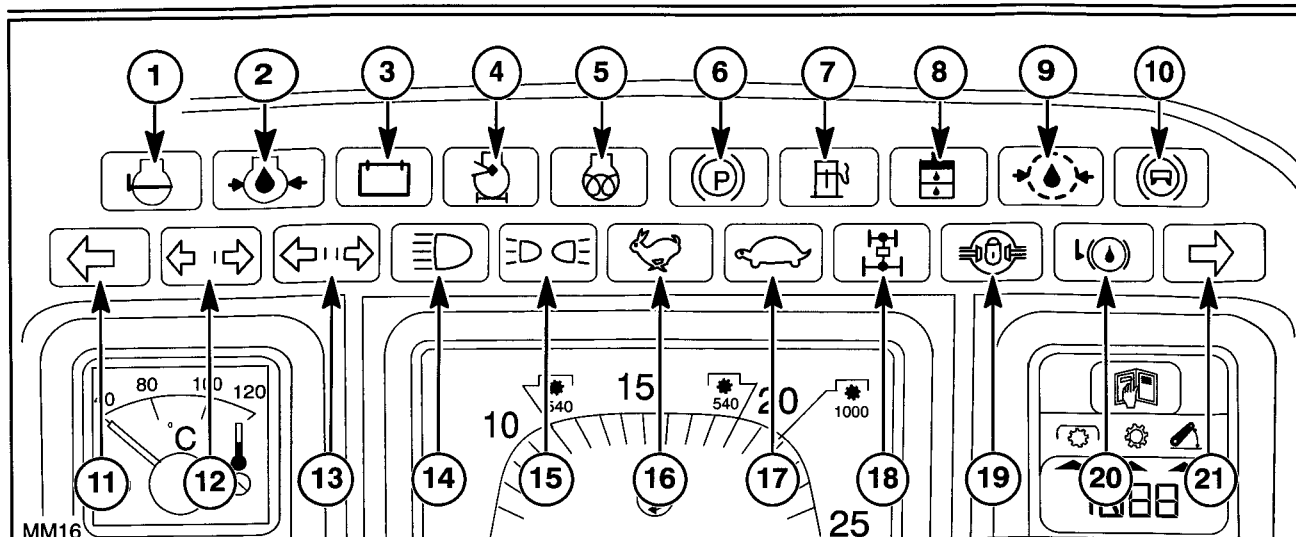
To indicate the area of the fault, one of the three arrows (1), (2) or (3) will flash, together with the symbol immediately above it. The symbols indicate:

- (1) Hydraulic lift system
- (2) Transmission
- (3) Any Electronic Management Unit (EMU) function (PTO, differential locks, FWD, etc.)

The code indicates the circuit or sensor in which the fault lies and the type of fault, e.g. short circuit, open circuit, sensor failure, etc. A list of possible faults and their causes appears in section 4 of this manual.



2-53



2-54

Indicator and Warning Lights

The twenty one colored lights provide operating information or give warning of system malfunction.

The lights function as follows:

Upper Row – left to right

1. Engine coolant level – Flashing light indicates coolant is below a pre-set level. Stop the engine and investigate the cause. See Lubrication and Maintenance (section 3).

WARNING: The cooling system operates under pressure which is controlled by the pressure cap on the coolant recovery tank. It is dangerous to remove the cap while the system is hot. When the system has cooled, use a thick cloth and turn the pressure cap slowly to allow the pressure to escape before fully removing the cap. Coolant should be kept off the skin. Adhere to the precautions outlined on the antifreeze container.

2. Engine oil pressure – Steady light indicates low engine oil pressure. Stop the engine and investigate the cause.

3. Alternator – Steady light indicates that the alternator is not charging.

4. Air cleaner – Steady light indicates that the air cleaner is blocked or partially blocked. Stop the tractor and service the air cleaner to prevent damage to the engine.

5. Thermostart – Light will illuminate when the Thermostart is activated by the key-start switch. See 'Starting the Engine' later in this section.

6. Parking brake – With the key-start switch on, a flashing light indicates that the parking brake is applied.

If the key-start switch is turned off and the parking brake is not applied, an audible alarm will sound continuously for a minimum of two minutes or until the handbrake is applied.

WARNING: To avoid personal injury, always apply the parking brake before leaving the tractor seat.

2-55

Upper Row – left to right

7. Water in fuel – Light will illuminate if water is detected in the fuel. Stop the tractor and service the fuel filters to prevent damage to the fuel injection system.

8. Transmission oil filter blocked – Steady light accompanied by **non-critical** alarm indicates that the transmission oil filter(s) is/are blocked or partially blocked. Stop the engine and service the oil filter(s) to avoid damage to the transmission.

9. Transmission oil pressure low – Steady light indicates that the transmission lubrication circuit oil pressure is low. Stop the engine and investigate the cause.

Flashing light indicates that the charge pump intake and pressure filters are blocked or partially blocked causing low pump pressure. Service the tractor as soon as practicable and certainly within 1 hour of operation.

10. Trailer brake – Not used in North America.

Lower Row – left to right

11. Left turn indicator – Light will flash in unison with tractor left-hand turn signal.

12. Trailer turn signal – Not used in North America.

13. Trailer turn signal – Not used in North America.

14. Headlight high beam – Light will be illuminated when the tractor lights are switched to high beam.

15. Parking lights – Light will be illuminated when the tractor lights are switched on.

16. Direct drive indicator – Light will illuminate to indicate that the transmission is in direct drive (23 F x 12 R transmission only).

17. Underdrive indicator – Light will illuminate to indicate that the transmission is in underdrive (23 F x 12 R transmission only).

18. Front wheel drive – Light will illuminate when the drive to the front wheels is engaged.

19. Differential lock – Light will illuminate when the differential lock(s) is/are in the engaged mode. See 'Front and Rear Differential Lock' later in this section.

20. Steady light indicates that the brake fluid level is low. Stop the engine and investigate the cause.

21. **Right turn indicator** – Light will flash in unison with tractor right-hand turn signal.

ELECTRONIC INSTRUMENT CONSOLE

The electronic instrument console is shown with all the displays activated.

The upper section consists of 21 colored lights (1) which provide operating information or give warning of system malfunction.

Information provided by the Tractor Performance Monitor is displayed in the right-hand panel (2).

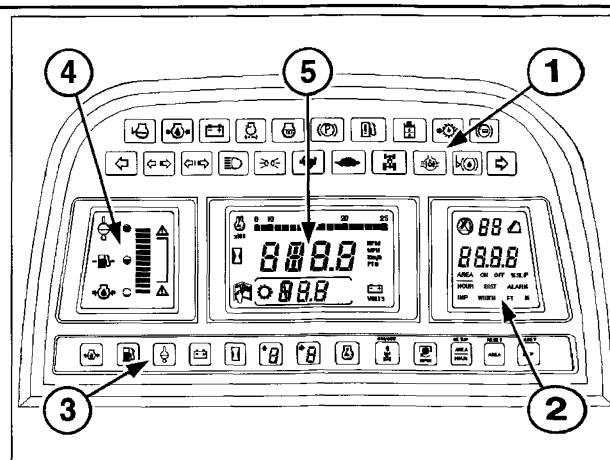
Thirteen touch-sensitive function selector buttons (3) are arranged in a line across the bottom of the instrument panel. Touching these buttons enables information on various tractor functions to be displayed in the three liquid crystal display (LCD) areas (2), (5) and (4).

The left-hand display (4) is in the form of a bargraph. Touching the appropriate function button will cause corresponding information on engine coolant temperature, fuel level and engine oil pressure to be displayed in the bargraph.

The main, central panel (5) consists of a multi-function LCD activated by the function selector buttons. A numerical read out of the following functions may be displayed:

- Engine speed (rev/min)
- Engine hours operated (actual time)
- Tractor ground speed (MPH or Km/h)
- P.T.O. speed (rev/min)
- Battery condition (volts)
- Gear ratio selected (23 F x 12 R transmission only)
- Diagnostic error codes (tractor circuits and transmission – will display automatically if a malfunction occurs)

In addition to the numerical display, engine speed is continuously displayed in the form of a bargraph across the top of the main display. A warning indication may be programmed into the display as a reminder to the operator that the next scheduled service is due.



2-56

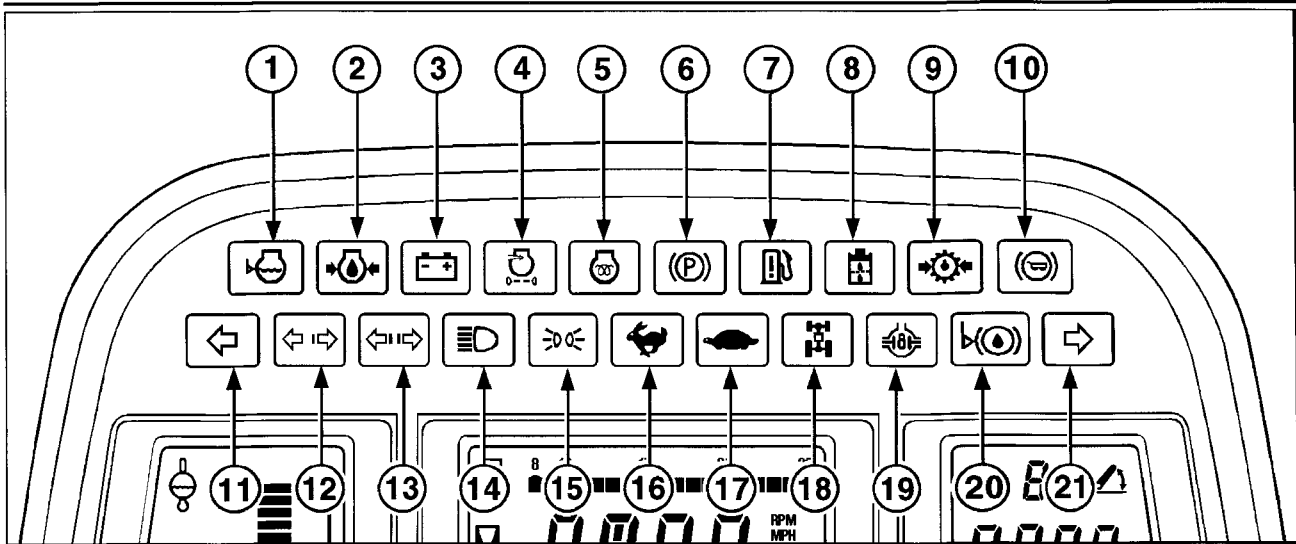
Information provided by the Tractor Performance Monitor is displayed in the right-hand panel (2). The display includes:

- Hitch enabled
- Hitch position
- Hitch disabled
- Area per hour forecaster (acres or hectares)
- Area accumulated (acres or hectares)
- Wheel slip (%) – optional feature
- Hydraulic system diagnostic error codes

Some tractor malfunctions are accompanied by an audible warning in addition to a warning light and a flashing error code in the relevant LCD.

When the key-start switch is turned on, a self-test of all the LCD segments is activated, the audible alarm will sound for approximately one second and the lamps that warn of a malfunction will be illuminated briefly, to confirm that the bulbs are functioning.

The LCD areas are illuminated when the tractor lights are turned on.



2-57

Indicator And Warning Lights With Audible Alarm

The 21 colored lights, provide operating information or give warning of system malfunction. The malfunction warning lights are accompanied by an audible alarm. Dependent upon the severity of the problem, the alarm will sound as follows:

Non-critical alarm: Continuous alarm for 5 seconds only.

Critical alarm: Intermittent alarm will sound until fault is corrected or engine is switched off. The lights/audible alarm function as follows:

Upper Row – left to right

1. Engine coolant level low – Light will illuminate accompanied by flashing LCD and **critical alarm**. Stop the engine and investigate the cause. See also 'Bargraph Display' on page 2-35.

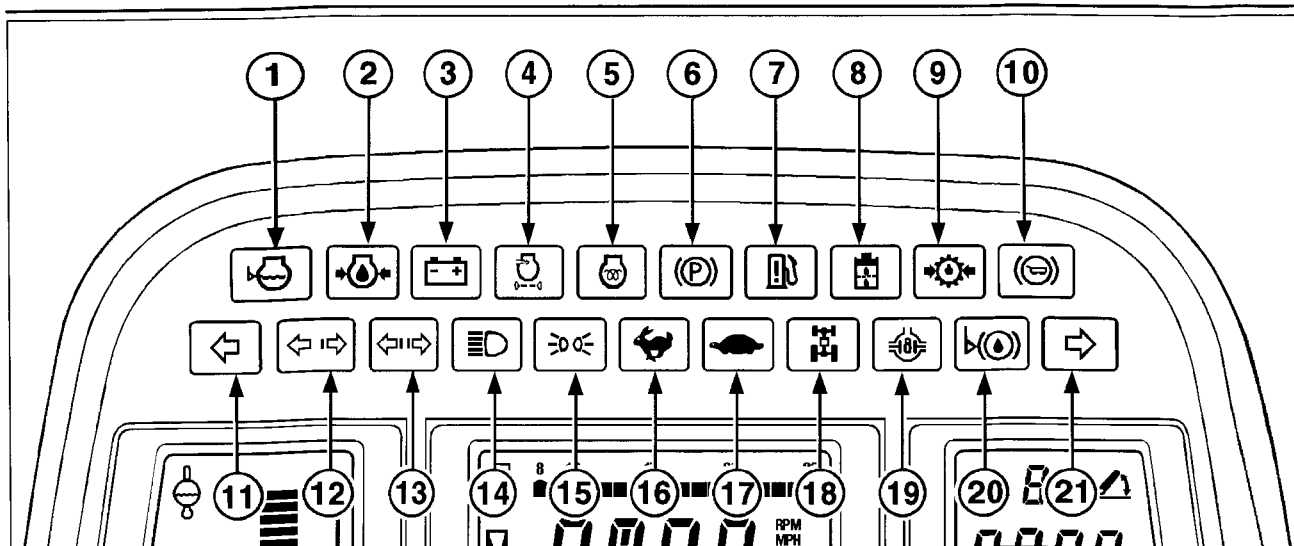
WARNING: The cooling system operates under pressure which is controlled by the pressure cap on the coolant recovery tank. It is dangerous to remove the cap while the system is hot. When the system has cooled, use a thick cloth and turn the pressure cap slowly to allow the pressure to escape before fully removing the cap. Coolant should be kept off the skin. Adhere to the precautions outlined on the antifreeze container.

2. Engine oil pressure low – Light will illuminate accompanied by flashing LCD and **critical alarm**. Stop engine and investigate the cause. See also 'Bargraph Display' on page 2-34.

3. Alternator not charging – Light will illuminate if alternator is not charging the battery.
4. Air cleaner – Light will illuminate accompanied by **non-critical alarm**. Stop the tractor and service the air cleaner to prevent engine damage.
5. Thermostart – Light will illuminate when the Thermostart is activated by the key-start switch. See 'Starting the Engine' later in this section.
6. Parking brake – With the key-start switch on, a flashing light indicates that the parking brake is applied. If any attempt is made to drive the tractor with the parking brake applied or partially applied, the **critical alarm** will sound. If the key-start switch is turned off and the parking brake is not applied, the **critical alarm** will sound continuously for two minutes or until the handbrake is applied.

WARNING: To avoid personal injury, always apply the parking brake before leaving the tractor seat.

7. Water in fuel – Light will illuminate accompanied by **non-critical alarm** if water is detected in the fuel. Stop the tractor and service the fuel filters to prevent damage to the fuel injection system.
8. Transmission oil filter blocked – Light will illuminate accompanied by **non-critical alarm** if transmission oil filter is blocked or partially blocked. Stop the engine and service the oil filter to avoid damage to the transmission.



2-58

9. Transmission oil pressure – Steady light accompanied by **critical alarm** indicates that the transmission lubrication circuit oil pressure is low. Stop the engine and investigate the cause.

Flashing light accompanied by **non-critical alarm** indicates that the charge pump intake and pressure filters are blocked or partially blocked causing low pump pressure. Service the tractor as soon as practicable and certainly within 1 hour of operation.

10. Trailer brake (not used in North America)

Lower Row – left to right

11. Left turn indicator – Light will flash in unison with tractor left-hand turn signal.
12. Trailer turn signal – (not used in North America)
13. Trailer turn signal – (not used in North America)
14. Headlight high beam – Light will be illuminated when the tractor lights are switched to high beam.

15. Parking lights – Light will be illuminated when the tractor lights are switched on.

16. Direct drive indicator – Light will illuminate to indicate that the transmission is in direct drive (23 F x 12 R transmission only).

17. Underdrive indicator – Light will illuminate to indicate that the transmission is in underdrive (23 F x 12 R transmission only).

18. Front wheel drive – Light will illuminate when the drive to the front wheels is engaged.

19. Differential lock – Light will illuminate when the differential lock is in the engaged mode. See 'Front and Rear Differential Lock' later in this section.

20. Brake fluid level – Light will illuminate to indicate that the brake fluid level is low. Stop the engine and investigate the cause.

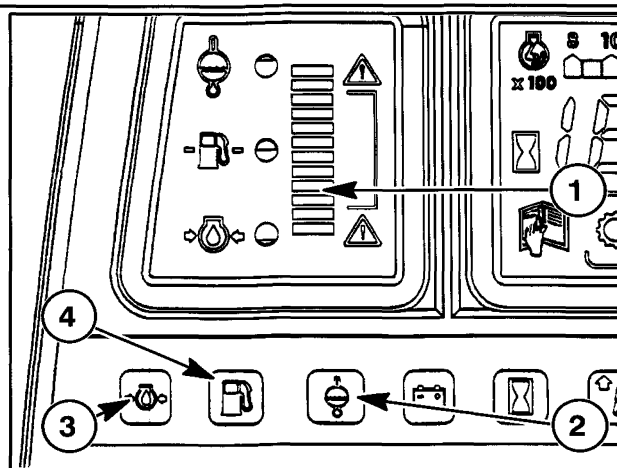
21. Right turn indicator – Light will flash in unison with tractor right-hand turn signal.

Bargraph Display (LCD)

The bargraph consists of twelve LCD segments (1). By touching the appropriate function selector button, one of three different tractor functions may be displayed. All three displays are shown, for reference only.

When the key-start switch is turned on, the bargraph will automatically display fuel level, unless one of the other two function buttons is touched. When the engine is started, the bargraph will automatically change to display engine oil pressure. After 10 minutes of operation, it will change again to display engine coolant temperature.

The bargraph may, of course, be made to show any of the other functions by touching the appropriate selector button (2), (3) or (4).



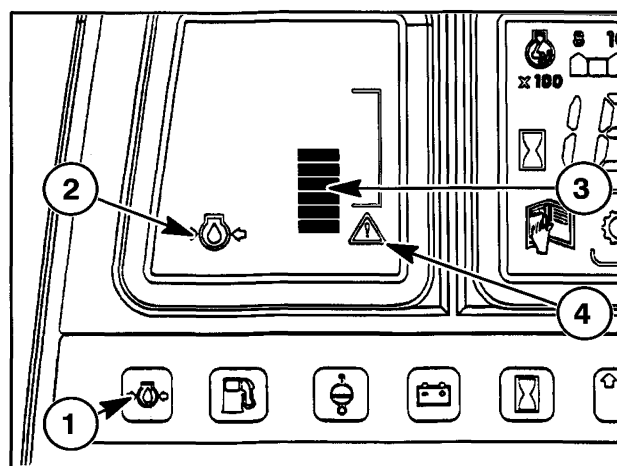
2-59

Engine Oil Pressure

Touch the button (1) to display engine oil pressure. The symbol (2) will display to signify that the bargraph relates to engine oil pressure. With normal engine oil pressure, up to ten segments of the bargraph (3) will be displayed.

Should engine oil pressure fall below a designated level, the bargraph and the 'low' warning symbol (4) will flash. The **critical alarm** will sound, the word STOP will flash in the central display and the Tractor Performance Monitor display will become blank. Stop the engine immediately and investigate the cause.

NOTE: The bargraph indicates engine oil pressure only. It is not an indication of oil level. The engine oil level must still be checked daily by means of the dipstick.



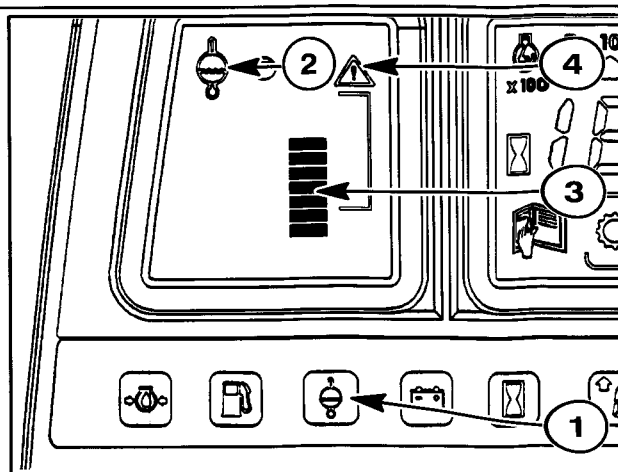
2-60

Engine Coolant Temperature

Touch the button (1) to display engine coolant temperature. The symbol (2) will display to signify that the bargraph relates to coolant temperature. One segment of the bargraph (3) will be displayed if the engine is cold. The number of segments displayed will increase as the engine warms up. With the engine at normal operating temperature, up to ten segments will be displayed.

Should the coolant temperature exceed a pre-determined level, the coolant symbol, the bargraph and the 'high' warning symbol (4) will flash. The **critical alarm** will sound, the word STOP will flash in the central display and the Tractor Performance Monitor display will become blank. Stop the engine immediately and investigate the cause.

NOTE: *The bargraph indicates engine coolant temperature only. It is not an indication of coolant level. The engine coolant level must still be checked daily.*



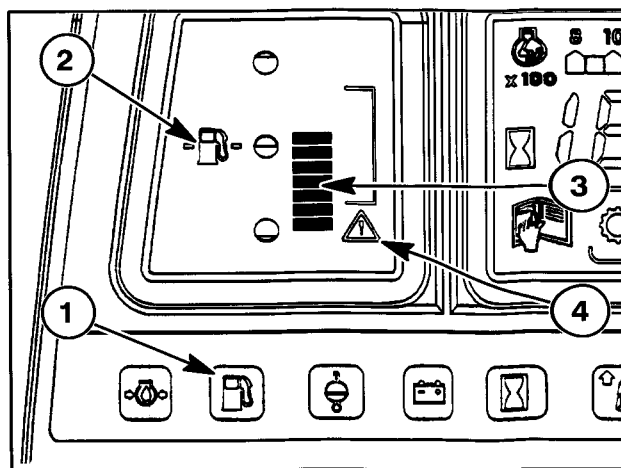
2-61

Fuel Level

Touch the button (1) to display fuel level. The symbol (2) will display, to signify that the bargraph display relates to fuel level. Each segment of the bargraph display (3) represents one-twelfth of the total fuel content of the tank(s).

When the fuel level falls such that only two segments of the bargraph are displayed, the bargraph and the 'low' warning symbol (4) will flash and the **non-critical alarm** will sound for 5 seconds.

NOTE: *Even if the bargraph is not displaying fuel level, when the content of the fuel tanks falls below the designated level, the bargraph will automatically change to display fuel level, the displays will flash and the alarm will be activated, as described above.*



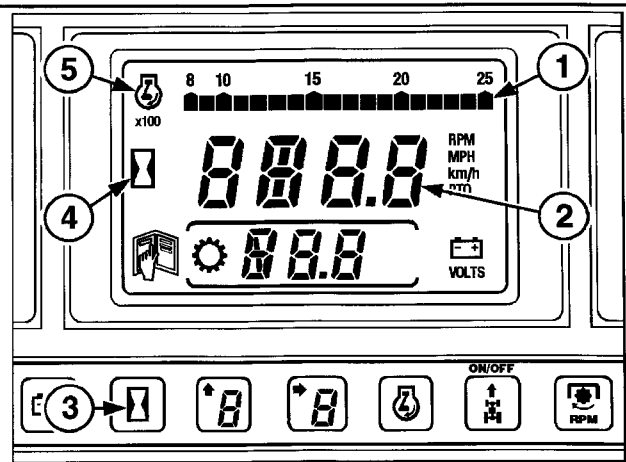
2-62

Central Display (LCD)

The central display area contains several digital displays with a bargraph above. The bargraph (1) provides a constant read-out of engine rev/min (5).

The digital displays (2) that may be selected using selector buttons (3) are:

- Engine speed (rev/min)
- Engine hours operated (actual time) (4)
- Tractor ground speed (MPH or Km/h)
- P.T.O. speed (rev/min)
- Battery condition (volts)
- Gear ratio selected (23 F x 12 R transmission only)
- Diagnostic error codes (tractor circuits and transmission – will display automatically if a malfunction occurs)



2-63

Engine Hourmeter

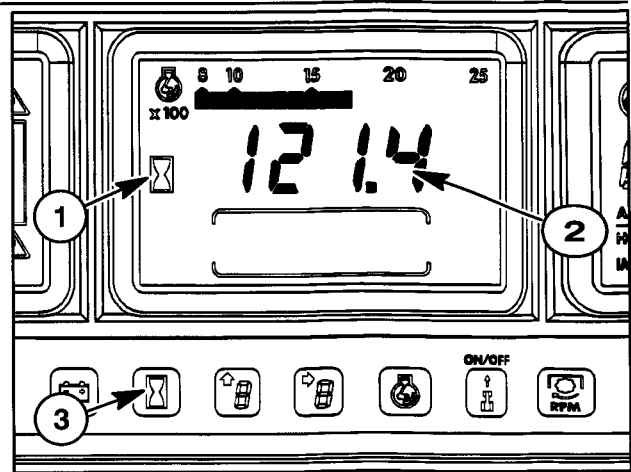
When the key-start switch is turned on, the hourmeter symbol (1) will display and the hours the engine has operated will appear in the main LCD (2). Manual selection of another function or starting the engine will cause the display to change. The hourmeter display may be recalled at any time by touching the button (3).

With the engine running, the hourmeter will accumulate hours in increments of 0.1 hours until 1000 hours is reached. After that time, the hourmeter will accumulate complete hours only, e.g. 1001, 1002 hours, etc.

NOTE: Accumulated hours are stored in the computer permanent memory which is not affected by disconnection of the tractor battery.

If the hour meter symbol (1) is flashing, the programmed "next service due" warning has been reached.

The hourmeter may be programmed to remind the operator when the next scheduled service is due. See 'PROGRAMMING THE MAIN DISPLAY' on page 2-39.



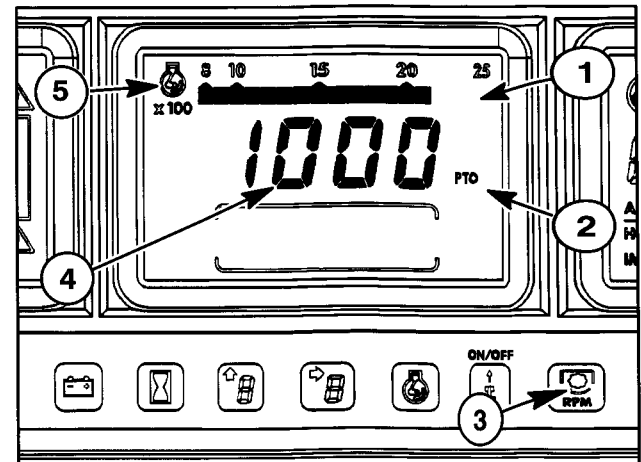
2-64

Engine Speed – Bargraph

With the engine running, the engine speed symbol (5) and bargraph (1) will display. Each segment of the 18 segment bargraph represents 100 rev/min and will provide a constant read out of engine speed between 800 and 2500 rev/min.

Power Take Off Display

Touch button (3) and the 'PTO' legend (2) will display, together with the P.T.O. speed in the main LCD (4).



2-65

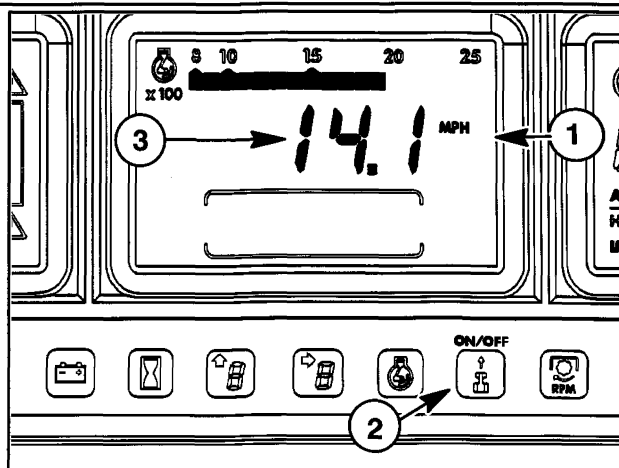
Ground Speed Display (Speedometer)

NOTE: The electronic instrument panel is set in the factory to display either MPH or km/h. If required, the display may be reprogrammed to show the alternate units. See 'PROGRAMMING THE TRACTOR PERFORMANCE MONITOR, on page 2-47.

Touch button (2) to show the ground speed in MPH or km/h in the main display (3). The 'MPH' or 'km/h' legend (1), as appropriate, will also be displayed.

NOTE: The speedometer senses rotation of the rear axle and may be subject to errors caused by the effects of wheel slip, tire pressures/condition, etc. If the optional slip control feature is installed, a radar unit senses true ground speed.

NOTE: The central display will automatically show ground speed if the tractor is travelling at more than 12.4 MPH (20 km/h). If it is required to display any other function, the appropriate selector button must be held.



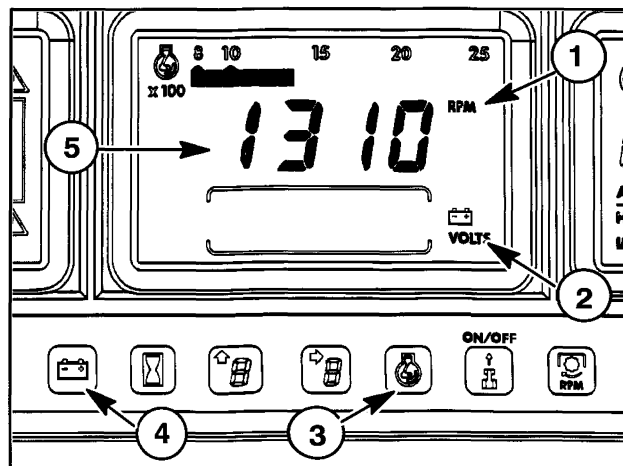
2-66

Engine Speed – Digital Display

With the engine running, touch button (3) and the 'RPM' legend (1) will display together with a digital display of engine rev/min in the main LCD (5) in increments of 10.

Battery Voltage

With the key switch on, touch selector button (4) to display the battery symbol (2) together with a digital display of battery voltage in the main LCD. Should the battery voltage fall below 10.0 volts or rise above 16.0 volts, the 5 second audio alarm will sound. During this period, the battery symbol will flash after which it will remain steady.



2-67

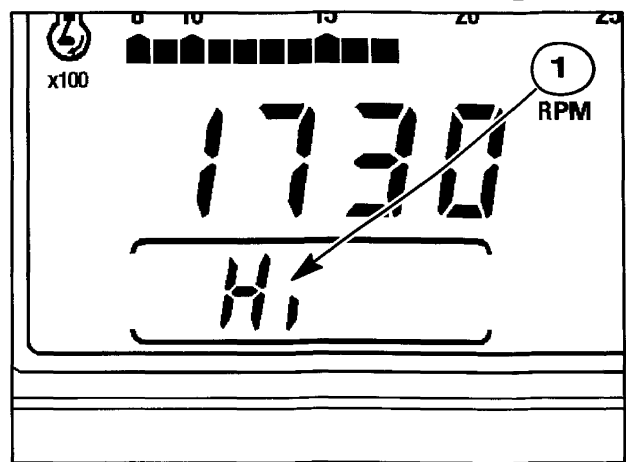
If another function is displayed and the battery voltage goes outside the pre-set limits, the display will automatically change to show the voltage and the alarm will sound, as previously described. If the display is manually changed to show another function while the battery voltage is outside the set limits, the battery symbol will continue to flash until the malfunction is corrected.

Transmission Gear Ratio Display (23 F x 12 R transmission only)

The lower LCD (1) provides a display of the gear ratio selected, provided the key-start switch is on.

The display will show “Hi” for direct drive, “Lo” for under drive, “N” for neutral and “R” for reverse.

NOTE: If your tractor is equipped with 17 F/18 F x 6 R powershift transmission then the selected gear ratio is displayed in a LCD adjacent to the gear shift lever.



2-68

PROGRAMMING THE MAIN DISPLAY

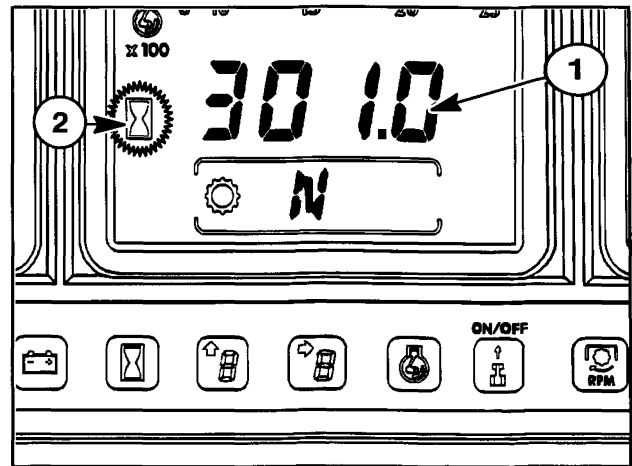
There are two functions that may be programmed into the computer module by the operator:

1. Next service due warning
2. Ground speed calibration

1. 'Next Service Due' Warning

The 'next service due' warning causes the hourmeter symbol (2) to flash every time the hourmeter (1) is displayed, when service becomes due. The symbol will flash for up to 10 hours as a reminder that the tractor is due for it's next scheduled service.

Example: This tractor was programed for the “next service due warning” at, every 300 hours.

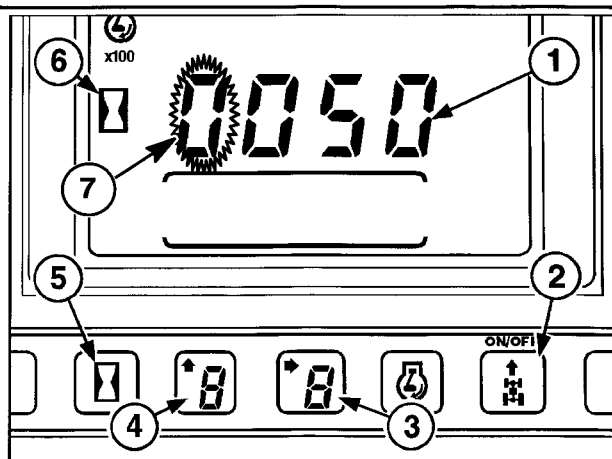


2-69

1. Programming the 'Next Service Due' Warning

With the key-start switch on but with the engine off, the hourmeter (1) will be displayed. Press and hold down button (5) for approximately three seconds until a 'beep' from the audible alarm indicates that the computer is in the programming mode.

A number in the display (1) corresponds to the 'next service due' interval previously entered into the memory. A '0000' programmed into the display will cancel the 'next service due' warning.



2-70

The left-hand digit (7) of the display will be flashing. If the digit is already reading '0' there is no need to change it. Touch the DIGIT SELECT button (3) to select the next digit to the right, which will flash.

Each touch of the DIGIT SET button (4) will increase the value of the flashing digit by one. When the digit reaches '3', touch the DIGIT SELECT button (3) which will cause the next digit in the display to flash.

Change the value of this digit, if necessary, using the DIGIT SET button (4), as previously described until it reaches '0'. Again, touch the DIGIT SELECT button (3) which will cause the next digit in the display to flash and change the value of this digit using the DIGIT SET button (4).

With '0300' displayed, enter the display into the memory by turning the key-start switch off. Every 300 hours of tractor operation (300, 600, 900 hours, etc.), the hourmeter symbol (6) will flash whenever the hourmeter is displayed. The display will continue to flash for 10 operating hours or until it is cancelled by touching buttons (2) and (5) simultaneously.

Cancel the Flashing Hourmeter

After the service has been completed, the flashing hourmeter is cancelled by touching buttons (2) and (5) simultaneously.

2. Ground Speed Calibration

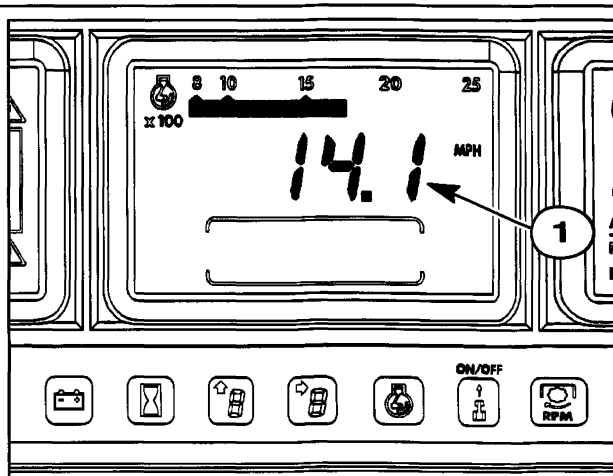
The ground speed (1) in the display is calibrated in the factory to suit the rolling radius of the rear tires. However, should tires of a different size be fitted or weights or equipment permanently installed on the tractor that would alter the rolling radius of the tires by more than 0.5 in (13 mm), then the computer module may be recalibrated to display a more accurate ground speed using the following method:

IMPORTANT: *If your tractor is equipped with the optional slip control feature, then the ground speed displayed is a true speed, as sensed by a radar unit. Calibration is **not** required, the calibration number being a constant '4018'.*

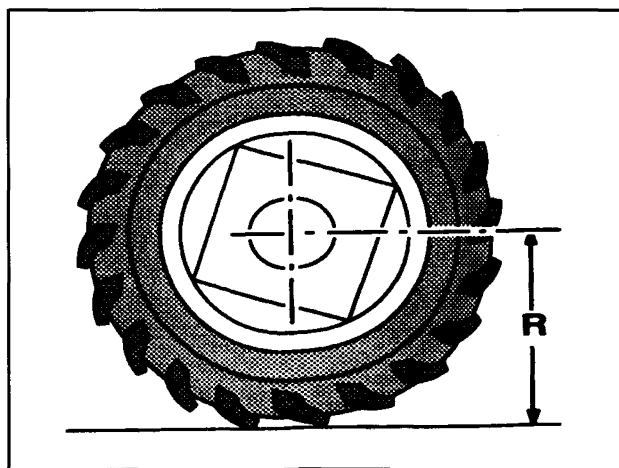
WARNING: *The radar ground speed sensor emits a low intensity microwave signal which will not cause any ill effects in normal use. Although the signal intensity is low, do **not** look directly into the face of the sensor while in operation so as to avoid eye damage. The radar sensor is beneath the front of the footsteps on the right-hand side.*

IMPORTANT: *Before arc welding on the tractor or equipment attached to the tractor, disconnect all power and ground leads to the instrument console/ Performance Monitor in order to avoid possible damage to electronic components.*

- Ensure that the tire pressures are correct for the load being carried. (See Tire Load/Inflation Tables at the end of this section of the Manual).
- Park the tractor on a firm level surface and carefully measure the distance from the center of the rear hub to the ground (R). This is the rolling radius.



2-71



2-72

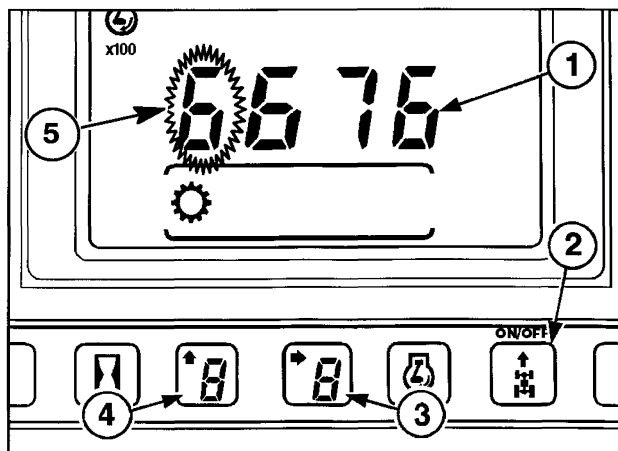
OPERATION

- Using the following table, note the calibration number that corresponds to the rolling radius, as measured.

NOTE: *The calibration number will vary by model and transmission type.*

Rolling Radius		Calibration Number	
		8160, 8260, 8360 with 17F/18F x 6R Transmission	All other Transmissions and Models
In.	mm		
29.0	737	8873	7986
29.5	749	8731	7858
30.0	762	8582	7724
30.5	775	8438	7595
31.0	787	8310	7479
31.5	800	8175	7357
32.0	813	8044	7240
32.5	826	7917	7126
33.0	838	7804	7024
33.5	851	7685	6916
34.0	864	7569	6812
34.5	876	7465	6719
35.0	889	7356	6621
35.5	902	7250	6525
36.0	914	7155	6440
36.5	927	7055	6349

- Turn the key-start switch on and hold down button (2) for 3 seconds. A 'beep' from the audible alarm indicates that the computer is in the programming mode and the previously entered calibration number (1) will be displayed with the left-hand digit(s) flashing.
- If required, change the value of the flashing digit using the DIGIT SET button (4), as described previously in Programming the 'Next Service Due' Warning.
- To select the next digit to the right, use the DIGIT SELECT button (3), and when that digit is flashing use the DIGIT SET button (4) to change the value. Repeat for the remaining digits.



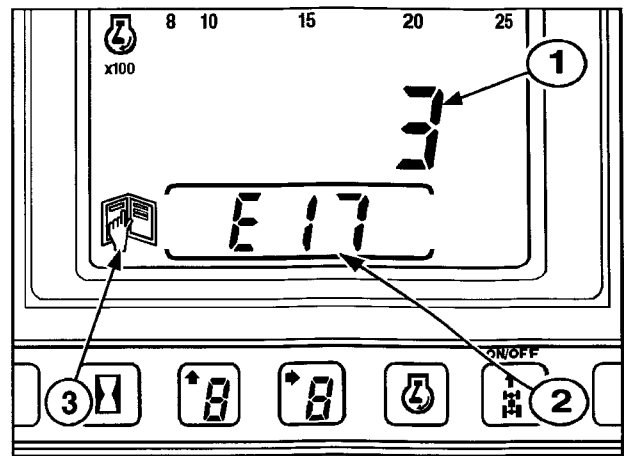
2-73

When the required calibration number is displayed, enter it into the memory by turning the key-start switch off.

Malfunction Warning Symbols

In the unlikely event that a fault occurs in the instrument panel or electronic transmission electrical circuits (23 F x 12 R transmission only), the malfunction warning symbol (3), will flash and an error code (1) will appear in the display.

The error code will be a simple one- or two-digit number. Instrument panel and Electronic Management Unit (EMU) error codes will appear in the main display (1), transmission error codes (23 F x 12 R transmission only) in the lower LCD (2). The transmission error code will be preceded by the letter 'E', as shown.



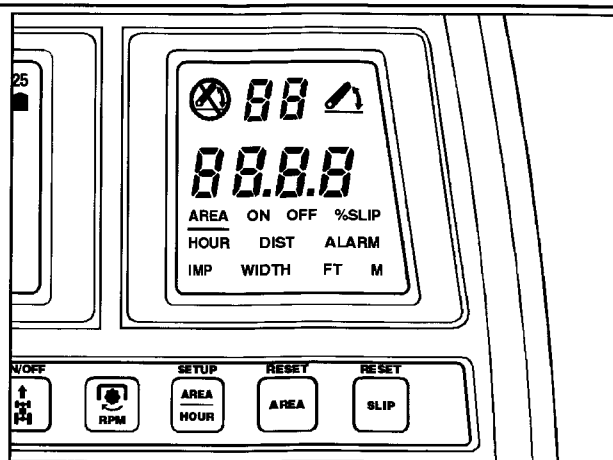
2-74

The code indicates the tractor circuit or sensor in which the fault lies and the type of fault, e.g. short circuit, open circuit, sensor failure, etc. In this event, the tractor will require the attention of your dealer.

TRACTOR PERFORMANCE MONITOR

The Tractor Performance Monitor (TPM) is displayed in the right-hand side of the instrument panel. The TPM with all the displays activated is shown. The display includes:

- Area per hour forecaster (acres or hectares)
- Area accumulated (acres or hectares)
- Hitch enabled
- Wheel slip (%) – with radar option
- Hitch position
- Hitch disabled
- Hydraulic system diagnostic error codes will display automatically if a malfunction occurs

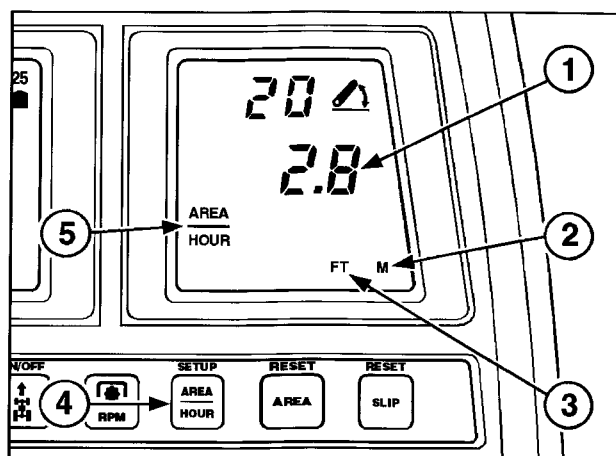


2-75

Area per Hour Forecaster

Touch the AREA/HOUR button (4). The 'AREA/HOUR' legend (5) will display, together with a forecast (1) of the area that will be worked in one hour if the current rate of work is continued. '0' will be displayed whenever the implement is raised.

When in the metric mode, denoted by 'M' (2), the forecast will be in hectares. In the English mode, denoted by 'FT' (3) the forecast will be in acres. See 'PROGRAMMING THE TRACTOR PERFORMANCE MONITOR' on page 2-47.



2-76

NOTE: If radar is not installed, area per hour calculations are based on axle speed and are subject to inaccuracies caused by the wheel slip that may be present.

Area Accumulator

Accumulated area (1) (total area worked) can be displayed by depressing the AREA button (4). The 'AREA' and 'ON' legends (5) will display. Off (6) should be displayed with the implement raised

When in the metric mode, denoted by 'M' (2), the accumulated area will be displayed in hectares. In the English mode, denoted by 'FT' (3) the area will be in acres. See 'PROGRAMMING THE TRACTOR PERFORMANCE MONITOR' on page 2-47.

In the metric mode, the display (1) starts to accumulate in increments of .01 hectares. When 100.0 hectares is reached, area accumulation continues in increments of 0.1 hectares until 1000 is reached. The display will then accumulate whole hectares. When 9999 hectares is reached, the display will reset to zero.

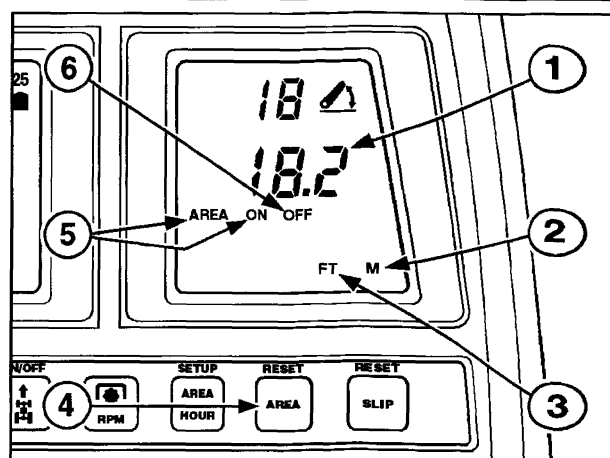
English display starts to accumulate in increments of 0.1 acres. When 1000 acres is reached, area accumulation continues in whole acres. When 9999 acres is reached, the display will reset to zero.

Area accumulation can be reset to zero at any time by holding down the AREA button (4) until a 'beep' is heard from the audible alarm (approximately 3 seconds).

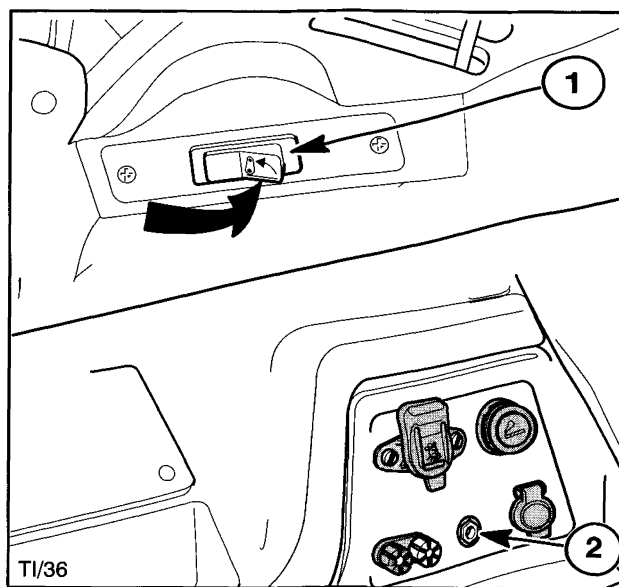
NOTE: *If the radar option is not installed, area calculations are based on axle speed and are subject to inaccuracies caused by the wheel slip that may be present.*

The area accumulator can be activated four ways.

- Raise the 3-point hitch using the FAST RAISE/WORK switch (1), to turn the display from ON to OFF.
- Raise the 3-point hitch using the quadrant lever.
- Touch the AREA button again and the word OFF will display and the word ON will disappear.
- An implement status jack (2) is located in the right side console. A trailing implement with a contact switch can be plugged into the jack. When the implement is lowered, the switch should close and ON should be displayed.



2-77



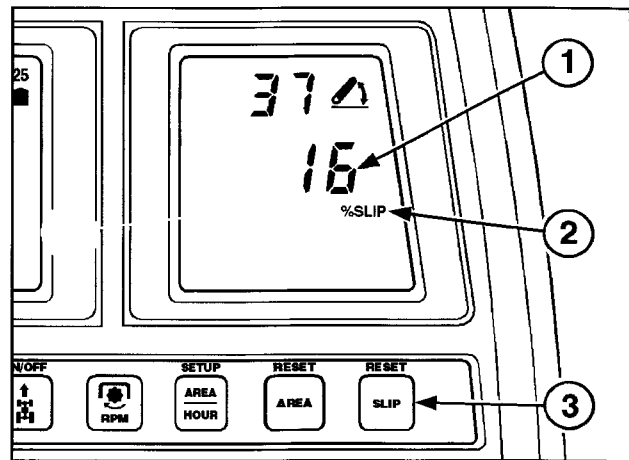
2-78

Wheel Slip (with radar option)

Touch the SLIP selector button (3). The '% SLIP' legend (2) will display together with a two-digit value (1) in the main TPM display. This slip value is detected by the comparison of theoretical ground speed (axle rotation sensor) with true ground speed (radar sensor).

Slip calibration occurs automatically. However, when widely differing soil conditions are encountered it may be necessary to manually recalibrate the wheel slip ratio, as follows:

Drive the tractor in the soil conditions to be worked, with implement raised, at a constant speed of less than 10 MPH (16 km/h). This will determine the minimum wheel slip, under light operating conditions, that is to be used as a reference point. Hold down the SLIP button (3) for at least 3 seconds. A 'beep' from the alarm and '0' in the display (1) indicates that the computer has been calibrated to a minimum slip condition.

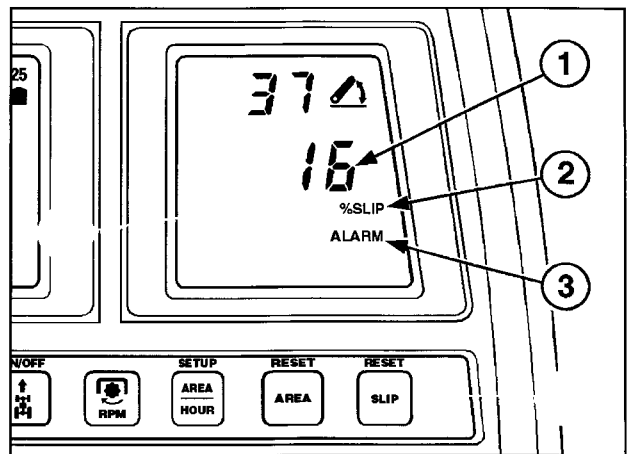


2-79

Slip Alarm (with radar option)

A slip alarm point may be entered to advise the operator when wheel slip exceeds the desired amount. See 'PROGRAMMING THE TRACTOR PERFORMANCE MONITOR'. When wheel slip exceeds the value entered, the alarm will sound for 5 seconds. If wheel slip is selected, the '% SLIP' legend (2) will be displayed as normal. In addition, the 'ALARM' legend (3) will flash and continue to flash until wheel slip is reduced to below the preset level.

If wheel slip is not being displayed, both the '% SLIP' legend (2) and 'ALARM' legend (3) will flash until the slip condition is reduced to below the preset level.



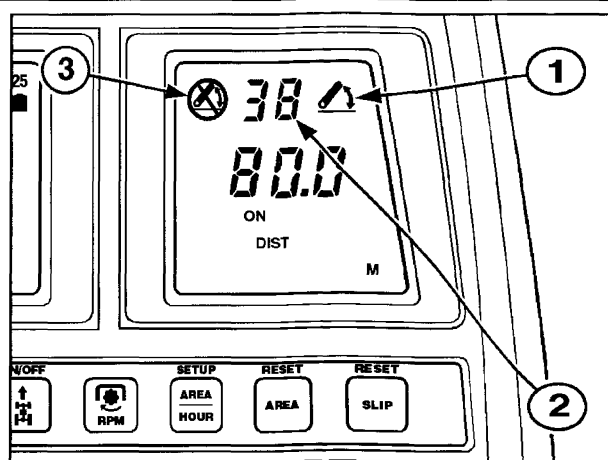
2-80

Hitch Enabled Symbol

The hitch enabled symbol (1) is displayed to advise the operator when the 3-point linkage is in phase with the hydraulic lift control lever. See 'ELECTRONIC DRAFT CONTROL' on page 2-79.

Hitch Position Display

The display (2) advises the operator of the position of the lower links (and implement) by means of numbers ranging from '0' (fully lowered position) to '99' (maximum lift height).



2-81

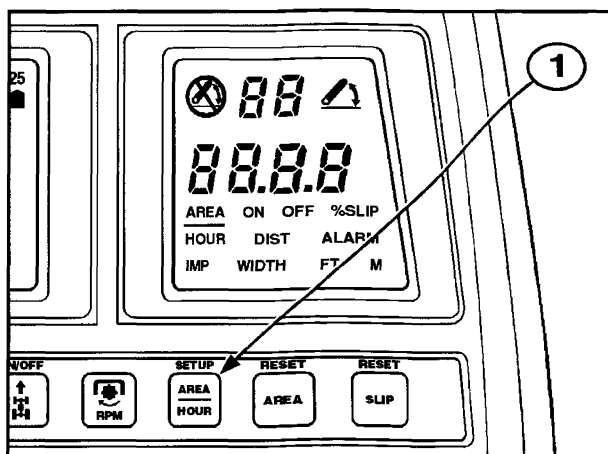
Hitch Disabled Symbol

The hitch disabled symbol (3) is displayed when the 3-point hitch is out of phase with the hydraulic lift control lever.

PROGRAMMING THE TRACTOR PERFORMANCE MONITOR

For the computer to correctly calculate work done (area per hour, area accumulated, etc.) various factors must be entered into the computer. To enter the TPM programming mode, turn the key-start switch on and hold down the SET UP button (1), until a 'beep' is heard from the alarm (approximately 3 seconds).

When in the programming mode, repeatedly touching the SET UP button (1) will cause the computer to run through the five programming functions in the order shown below. As each programming function is selected, the appropriate legend will be displayed in the lower part of the LCD.



2-82

Function	Legend displayed
1. Implement width	IMP WIDTH
2. Slip alarm point (option)	% SLIP ALARM
3. Area preset	AREA
4. Distance measurement	ON DIST
5. English/metric units selection	FT or M

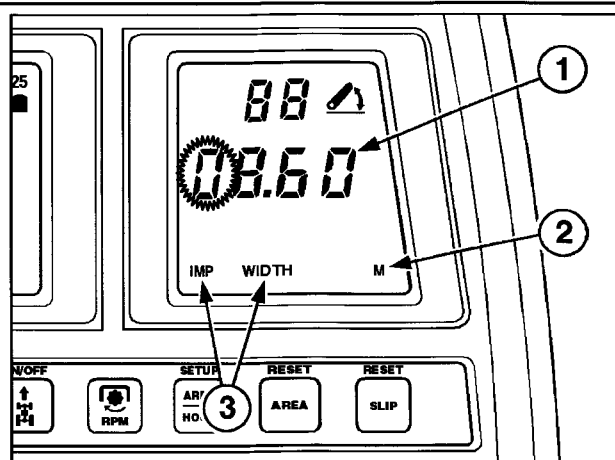
To exit the programming mode, turn the key-start switch off.

Set the functions in the following order:

Setting Implement Width

For the computer to calculate the work done, the working width of the implement in use must be entered into the memory.

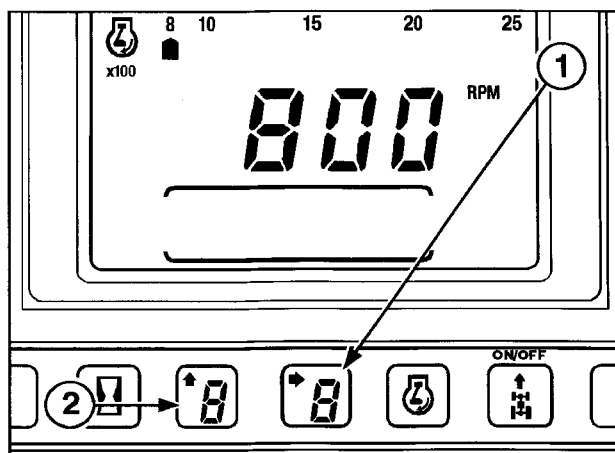
Implement width is a four-digit display and will appear as '00.00' metres (1) or '000.0' feet with the left-hand digit flashing. 'IMP WIDTH' (3). Either 'M' (2) or 'FT' will also be displayed to indicate metric or English measure.



2-83

To set an implement working width of, 12.5 feet, a display of '012.5' is required. Touch the DIGIT SELECT button (1), to cause the second digit from the left to flash. Touch the DIGIT SET button (2) to change the flashing digit from '0' to '1'. Use the DIGIT SELECT and DIGIT SET buttons to change the remaining digits until '012.5' is displayed.

NOTE: The area measured will only be accurate if there is no implement overlap when the tractor turns around at the end of a run to make another pass. The implement width entered into the computer memory may be reduced by the estimated amount of overlap to improve accuracy.



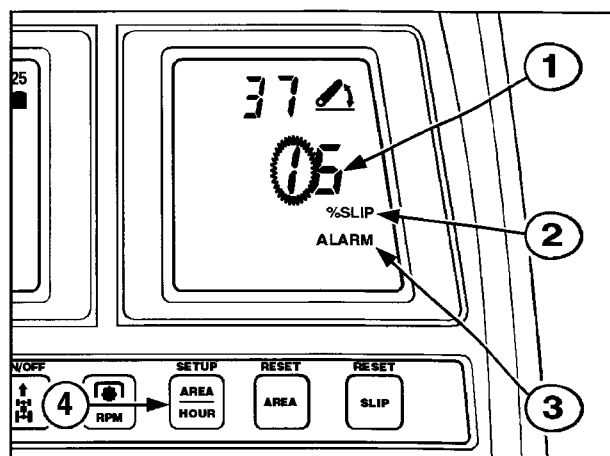
2-84

With the required implement width displayed, touch the SET UP button (1) Figure 2-82, to enter the memory and change the display to the slip alarm point.

Setting the Slip Alarm Point (option)

NOTE: If the optional *radar* unit is not installed, the slip alarm function will *be* omitted from the sequence.

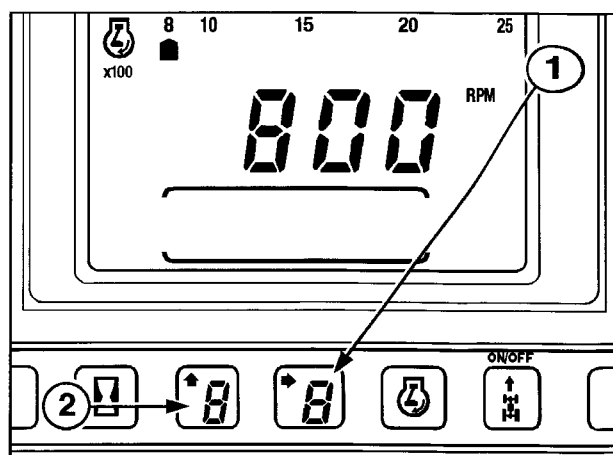
The slip alarm point will appear as a two-digit display (1), with the left-hand digit flashing. '% SLIP' (2) and 'ALARM' (3) will also be displayed.



2-85

Use the DIGIT SELECT (1) and DIGIT SET buttons (2) to change the value to the required setting. If the slip alarm is not required, set the display to '00'.

With the required slip alarm point displayed, touch the SET UP button (4) Figure 2-85, to enter the alarm point into memory and change the display to show area preset.



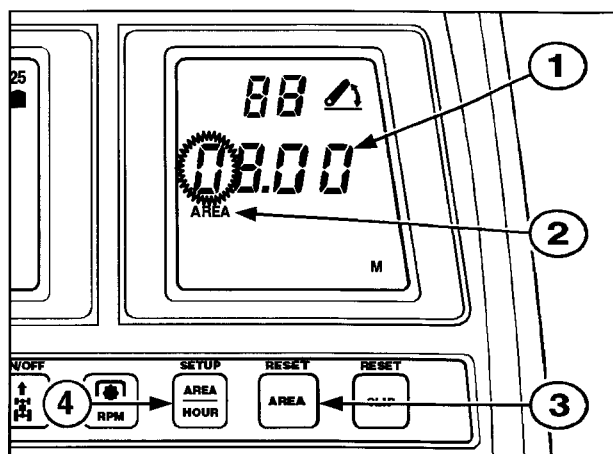
2-86

Area Preset

Normally, area would be reset to zero by holding the AREA button (3), down until a 'beep' is heard from the alarm (approximately 3 seconds). However, it is possible to enter a value other than zero. Area measured during a previous operation can be entered or an estimate of implement overlap can be entered at the start of a job.

The area preset will appear as a four-digit display (1) with the left-hand digit flashing. 'AREA' (2) will also be displayed in the LCD. Use the DIGIT SET and DIGIT SELECT buttons (2) and (1), Figure 2-86, as previously described, to change the value to the required setting.

Touch the SET UP button (4) to enter the value into memory and change the display to show distance accumulation.



2-87

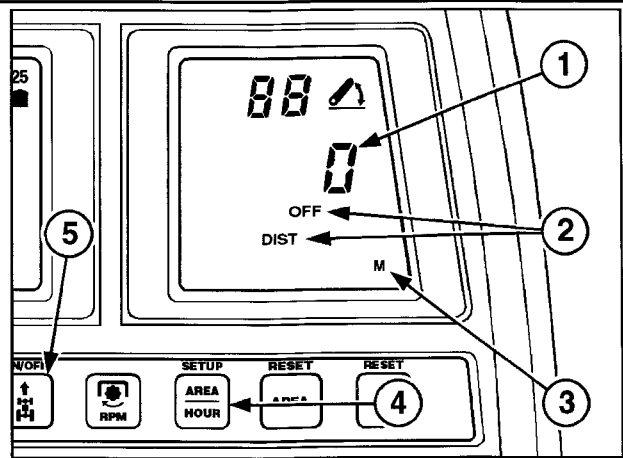
Distance Measuring Mode

The distance measurement mode allows operators to measure field lengths and widths to estimate materials etc.

When entering this mode, the display will show 'DIST OFF' (2) and either 'FT' or 'M' (3), depending upon whether English or metric measure had previously been selected. '0' will also appear in the display (1).

To start distance measurement, touch the ON/OFF button (5). The display will show a constantly changing distance travelled while the tractor is moving. To stop distance measurement, touch the ON/OFF button again.

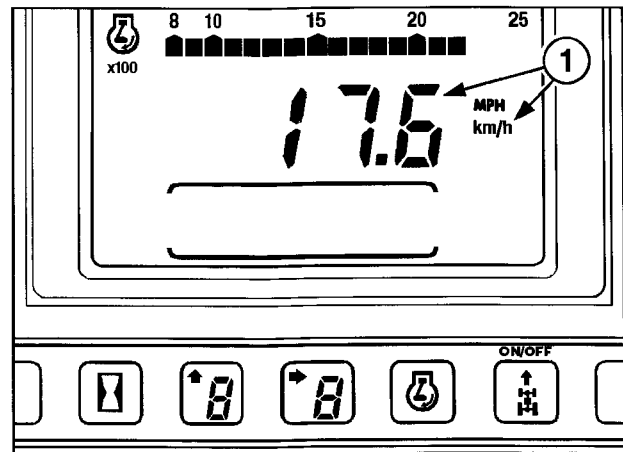
Touch the SET UP button (4) to change the display to show Imperial/metric units selection.



2-88

Setting Metric/English Units

The TPM digital display will be blank with either FT or M (1) Figure 2-90, flashing and the corresponding ground speed units km/h (1) Figure 2-89 or MPH flashing in the central display.



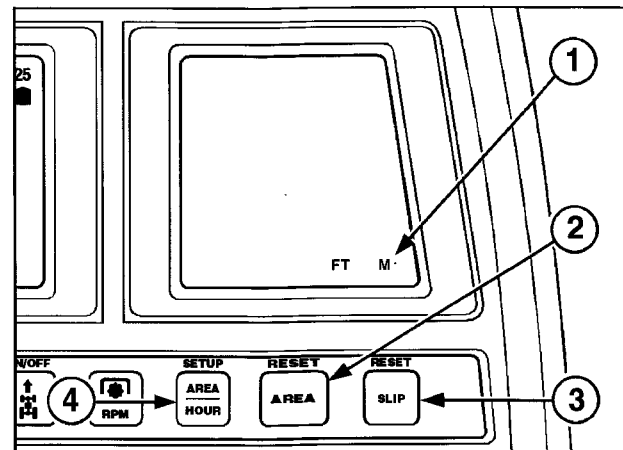
2-89

If the metric measure legends 'M' (metres) and 'km/h' are flashing but Imperial measure 'FT' (feet) and 'MPH' are required, touch either of the RESET buttons (2) or (3), to change the display. Touch either of the RESET buttons again to revert to Imperial measure.

With the required measure displayed (Imperial or metric), touch the SET UP button (4), to enter the selection to memory and change the display to implement width set up.

Exiting the Set Up Mode

To exit the set up mode, press and hold the SET UP button (4) for 3 seconds when a 'beep' from the audible alarm will be heard and the display will go to the AREA/HOUR mode. Alternatively, to exit the set up mode, turn the key-start switch off.

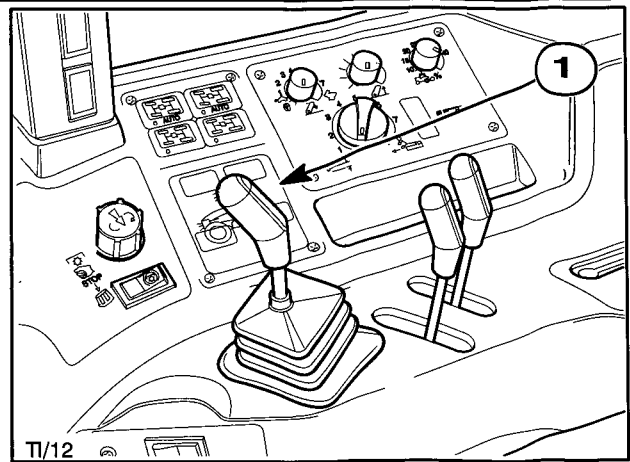


2-90

The Tractor Performance Monitor is now programmed for use.

FRONT AND REAR WORK LAMPS

The work lamp switch panel (1), on the right-hand console, is part of the Electronic Management Unit. The lower section of the unit contains two or four touch pads, used to activate the worklamps. An outline of the tractor is superimposed over the pads with an LED indicator at each tractor worklamp position. When touched, the alarm will 'bleep' to advise that a pad has been activated, when the key-start switch is on.



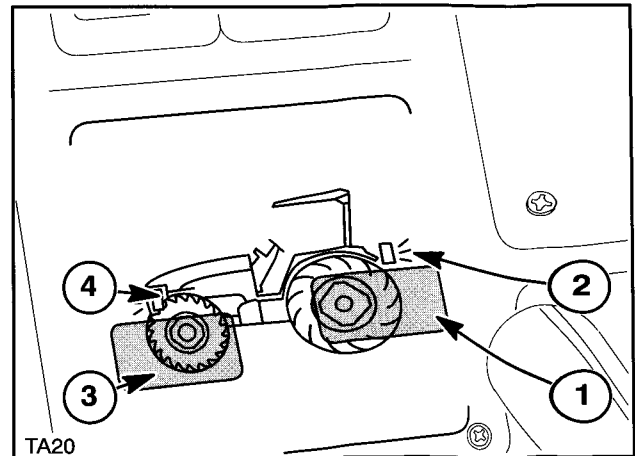
2-91

Up to nine work lamps may be installed on the tractor, depending on tractor specification level. The work lamp switch panel installed on a tractor without cab is shown.

The switch panel shown in Figure 2-93 is installed on a tractor with cab.

Touch the pad (1) to operate the rear, fender-mounted work lamps. The LED (2) will illuminate with the work lamps.

Touch the pad (3) to operate the front, grille-mounted work lamps (and the additional pair mounted on the grab rails, if equipped). The LED (4) will illuminate with the work lamps.

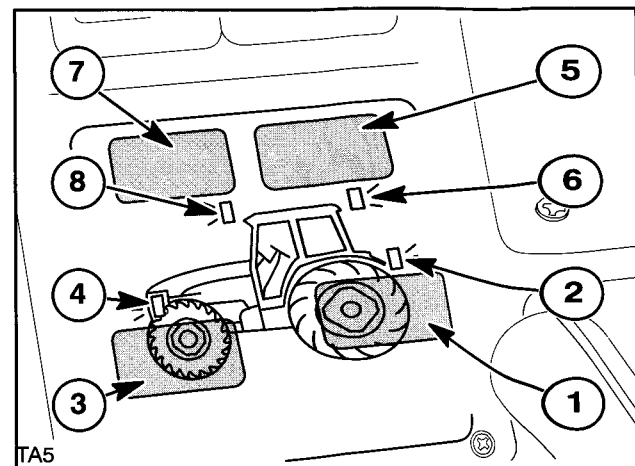


2-92

Touch the pad (5) to operate the rear, roof-mounted work lamps. The LED (6) will illuminate with the work lamps.

Touch the pad (7) to operate the front, roof-mounted work lamps. The LED (8) will illuminate with the work lamps.

NOTE: The work lamps are only operative with the tractor lights on. During operation, if the tractor lights are turned off, the work lamps will be extinguished. However, the setting will be memorised and the same work lamps will be activated when the lights are turned on again. If the key-start switch and tractor lights are turned off, the work lamps will also be extinguished. When the tractor lights are turned on the worklamps will remain off, until reselected by means of the touch pads.



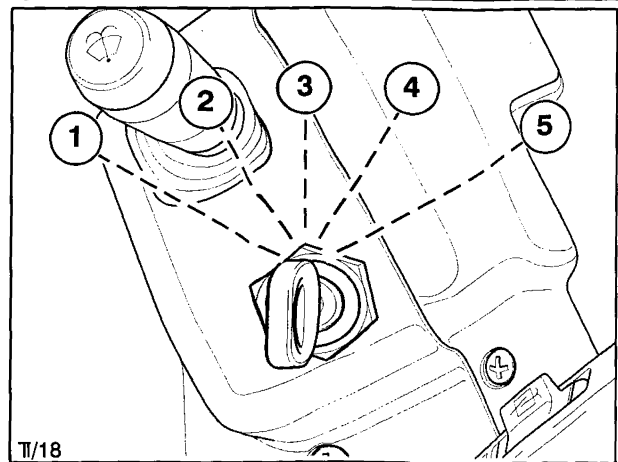
2-93

STARTING AND STOPPING THE ENGINE

Key Start Switch

A five-position key-start switch is installed. The key-start switch positions are as follows:

Position 1	Thermostart activated
Position 2	Off
Position 3	Accessories on
Position 4	Warning lights and instruments on
Position 5	Starter motor engaged



T/18

2-94

IMPORTANT: *Never push or tow the tractor to start the engine. Doing so may damage the drive train.*

NOTE: *Safety start switches prevent operation of the starting motor unless the forward/reverse (shuttle) lever is in the neutral (N) position and the clutch pedal is depressed.*

Before starting the engine, always use the following procedure:

- Sit in the driver's seat with the seat belt fastened.
- Ensure that the parking brake is firmly applied.
- Ensure that **all** gearshift levers are in neutral.
- Ensure that the P.T.O. knob is in the 'off' position.
- Place the remote control valve levers in the neutral position.
- Move the hydraulic lift control lever fully forward.

WARNING: *Check the area beneath the equipment to ensure that no injury or damage will be caused when equipment is lowered.*

- Depress the clutch pedal.

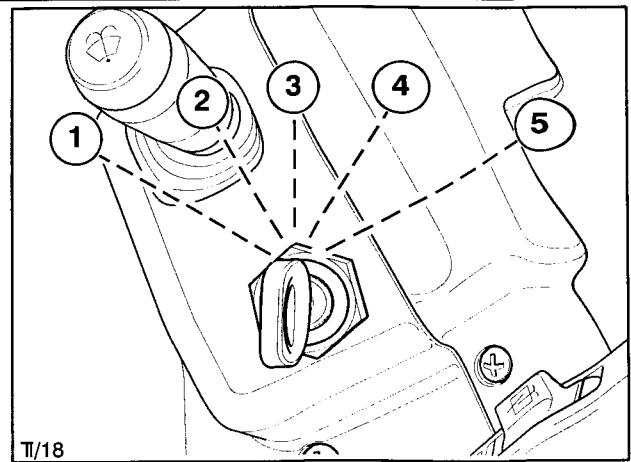
IMPORTANT: *Turbo-charged engines only: The high operating speed of the turbo-charger makes it essential that adequate lubrication is assured when the engine is started. Therefore, idle the engine at no more than 1000 rev/min for approximately one minute before driving the tractor.*

Starting in warm weather or when the engine is hot

- Open the hand throttle halfway, depress the clutch and turn the key-start switch fully clockwise to position (5), to operate the starting motor. Crank the engine until it starts but do not operate the starting motor for more than 60 seconds.

NOTE: *Once the starter motor has been operated, it is necessary to return the key-start switch back to the 'off' position before the starting motor can be re-activated.*

- Return the throttle to the idle position and check that all warning lights extinguish and gauge readings are normal.



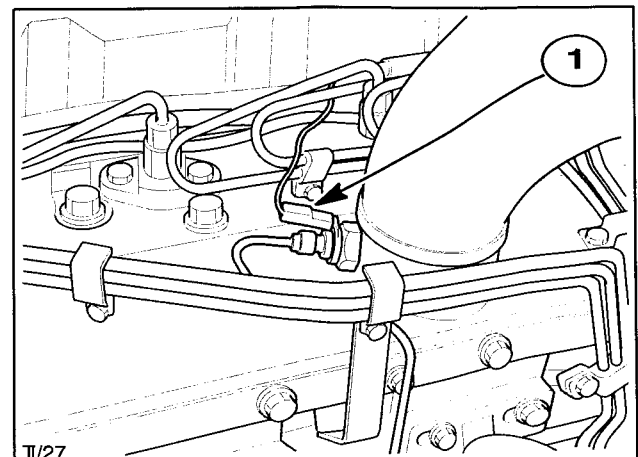
2-95

Starting in cold weather – below 40° F (4° C) with a cold engine

WARNING: *Your tractor is equipped with the Thermostart cold weather starting aid. Do not use ether with Thermostart installed. It will explode in the intake manifold. If, in an emergency, it is necessary to use ether, disconnect the Thermostart wire (1), from the heater terminal on the intake manifold.*

The Thermostart, which is effective in ambient temperatures down to 0° F (–18° C), consists of a heating element installed in the intake manifold. When operated by the key-start switch, the Thermostart will ignite fuel in the manifold, heating the air prior to it being drawn into the combustion chamber.

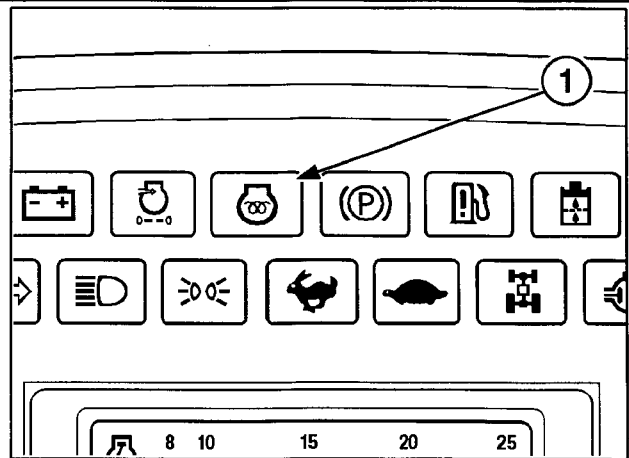
If temperatures below 0° F (–18° C) are encountered, a coolant immersion heater is available as an accessory. The coolant immersion heater is effective in ambient temperatures down to –20° F (–29° C) when used in conjunction with the Thermostart.



2-96

- Open the hand throttle halfway and turn the key-start switch counterclockwise to position (1) Figure 2-95. An indicator light (1), on the instrument panel will illuminate to show that the Thermostart heater is active. Allow the key to spring-return to position (2) Figure 2-95. When the light goes out, depress the clutch and turn the key fully clockwise to position (5) Figure 2-95. Crank the engine until it starts but do not operate the starting motor for more than 60 seconds.

NOTE: If the key is turned to the crank position (5) Figure 2-95, within 3 seconds of the indicator light going out, the Thermostart will be re-activated during cranking.



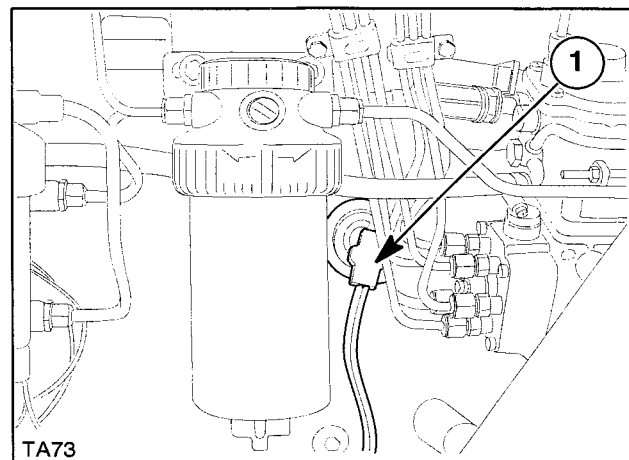
2-97

- If the engine fails to start, repeat the procedure. If the engine still fails to start, allow the battery to recover for 4 – 5 minutes then repeat the procedure.
- When the engine starts, return the throttle to the idle position and check that all warning lights extinguish and gauge readings are normal.

COOLANT IMMERSION HEATER (where equipped)

This dealer installed accessory consists of a heating element (1) installed into one of the core plugs on the right-hand side of the block. The heater is available in 115 volts A.C. This accessory provides easier starting down to -20°F (-29°C).

WARNING: To avoid shocks or other injuries, never use an nongrounded or inadequate extension lead. Always use a grounded, three wire extension lead, which is rated for at least a 15 amp load, in conjunction with a circuit breaker or ground fault trip device.



2-98

To operate the heater, connect the heater plug cord to a suitable 115 volt outlet, for up to four hours before carrying out the cold weather starting procedure.

NOTE: The heater may be left plugged in for more than four hours without harm. However, no noticeable increase in the heater's effectiveness will be achieved after this period.

STARTING THE TRACTOR WITH JUMP LEADS

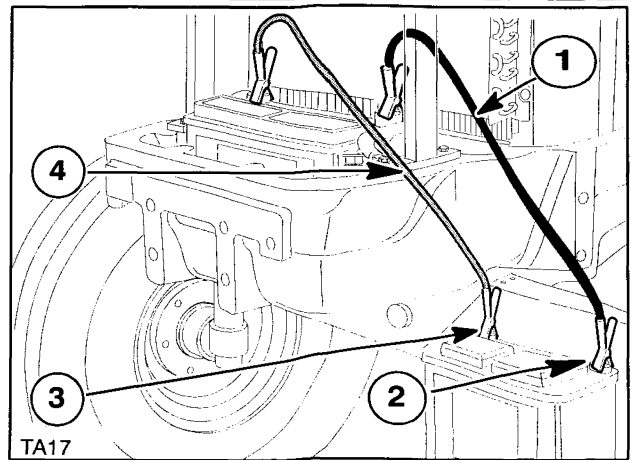
WARNING: *Operate the starter motor only from the driver's seat. If the key-start switch is by-passed, the engine may start inadvertently in gear and cause sudden and unexpected movement of the tractor or a tractor runaway which may cause serious injury. Wear eye protection when starting the tractor with jump leads or when charging the battery.*

If it is necessary to use jump leads (booster cables) to start the tractor, use only heavy duty leads. Proceed as follows:

- Connect one end of the red jump lead (4) to the lower tractor battery positive (+) terminal and the other end to the positive (+) terminal of the auxiliary battery (3).
- Connect one end of the black jump lead (1) to the lower tractor battery negative (-) terminal and the other end to the negative (-) terminal of the auxiliary battery (2). Follow the starting procedure previously described.
- When the engine starts allow it to run at idle speed, turn on all electrical equipment (lights, etc.) then disconnect the jump leads in the reverse order to the connecting procedure. This will help protect the alternator from possible damage due to extreme load changes.

IMPORTANT: *When using an auxiliary battery to start the engine, ensure that the polarity of the jump leads is correct – **positive to positive, negative to negative**, otherwise the alternator may be damaged. Only use an auxiliary battery if the tractor batteries are discharged. Excessive amperage (above 1600 cca) may damage the starting motor.*

In the event of the batteries being severely discharged, such that terminal voltage is below 7 volts, recovery will require a special charging procedure. See your authorized dealer.



2-99

STOPPING THE ENGINE

IMPORTANT: Before stopping, idle the engine at or below 1000 rev/min for approximately one minute. This will allow the turbo-charger and manifold to cool and prevent possible distortion of components.

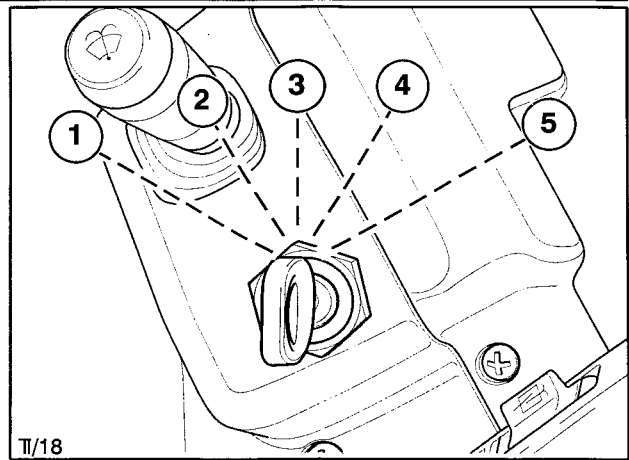
To stop the engine:

- Sit in the driver's seat.
- Close the throttle.
- Ensure that the parking brake is firmly applied.
- Ensure that **all** gearshift levers are in neutral.
- Ensure that the P.T.O. knob is in the 'off' position.
- Place the remote control valve levers in the neutral position.
- Move the hydraulic lift control lever fully forward to lower all hydraulic equipment to the ground.



WARNING: Check the area beneath the equipment to ensure that no injury or damage will be caused when equipment is lowered.

- Turn the key-start switch off – position (2).



2-100

RUN-IN PROCEDURE

Your new tractor will provide long and dependable service if given proper care during the 50 hour run-in period and if serviced at the recommended intervals.

Avoid overloading the engine. Operating in too high a gear under heavy load may cause excessive engine overloading. Overloading occurs when the engine will not respond to a throttle increase.

Do not operate without a load on the engine. This can be as harmful to the engine as overloading. Vary the type of operation undertaken so that the engine is subjected to heavy as well as light loads during the run-in period.

Use the lower gear ratios when pulling heavy loads and avoid continuous operation at constant engine speeds. Operating the tractor in too low a gear with a light load and high engine speed will waste fuel. You will save fuel and minimize engine wear by selecting the correct gear ratio for each particular operation.

Check the instruments and warning lights frequently and keep the radiator and oil reservoirs filled to the recommended levels.

DRIVING THE TRACTOR



WARNING: Observe the following precautions when driving the tractor:

- Watch where you are going – especially at row ends, on roads and around trees.
- Use extreme caution when operating on steep slopes.
- Keep the tractor in gear when going down hill. Use a low gear to maintain control with minimum braking.
- If the tractor is stuck, reverse out to prevent overturning the unit.
- Always use the drawbar or lower links in the lowered position for pull-type work. Do not pull from any other part of the tractor since it may tip backward.

- When driving on public roads, have consideration for other road users. Pull to the side of the road so that any following traffic may pass.
- Use low beam headlights when meeting a vehicle on the highway at night. Keep the lights adjusted so they do not blind the operator of an oncoming vehicle.
- Engage the clutch slowly when driving out of a ditch, gully or up a steep hillside. Disengage the clutch promptly if the front wheels rise off the ground.
- Reduce speed before turning or applying the brakes. Brake both wheels simultaneously when making an emergency stop.
- It is essential that the brake pedals are locked together when travelling at high speed or on the highway to ensure balanced operation of the tractor brakes and four wheel braking (front wheel drive tractors only).
- Never apply the differential lock when turning.
- Use extreme caution and avoid hard application of the tractor brakes when pulling heavy, towed loads at road speeds.
- Towing loads that weigh more than the weight of the tractor should have brakes for safe operation. Ensure compliance with local regulations.
- Always sit in the driver's seat with the seat belt fastened while starting or driving the tractor.

TRANSMISSIONS

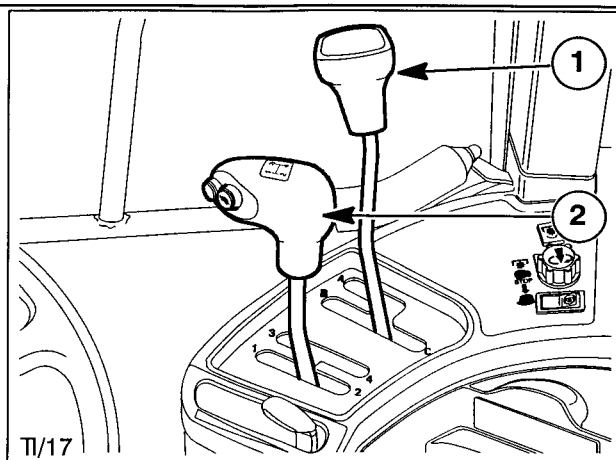
Two transmissions are available depending upon model and specification level. Because of speed restrictions one or more ratios may be blocked out to reduce maximum speed. This will be explained in further detail within the text.

NOTE: All gear levers, as well as the throttle controls, are color-coded orange.

23 F x 12 R TRANSMISSION

This synchromesh transmission offers 23 forward gear ratios with 12 reverse ratios. The optional creeper gears will double the number of available gear ratios, both forward and reverse. Details of creeper gear operation will be found later in this section.

Operation is by means of the main shift lever (2), the range lever (1) and an electrically operated shuttle lever (1) Figure 2-103, in conjunction with the direct drive/underdrive switches and clutch pedal.



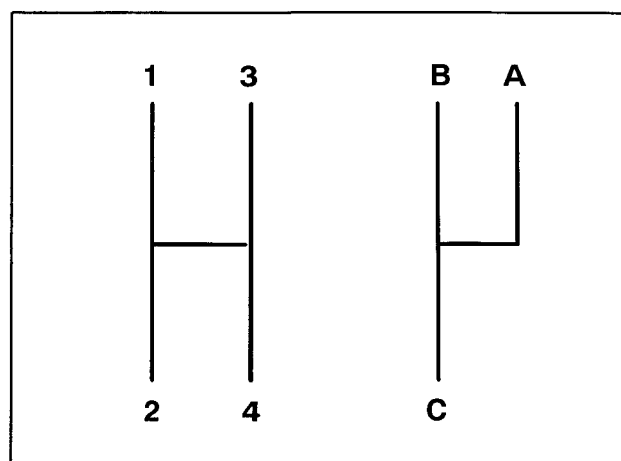
2-101

Main Gear Shift Lever

The main gear shift lever (left-hand lever) operates in a conventional H-pattern and, in conjunction with the clutch pedal, is used to select any of four gear ratios, whether the tractor is stationary or moving.

Range Lever

The range lever (right-hand lever), in conjunction with the clutch pedal, is used to select any one of three ranges (A, B and C), which has the effect of tripling the number of ratios to 12, both in forward and reverse. The design of the transmission permits changes between the medium (B) and high (C) ranges while the tractor is moving. The (A) range is not synchronized. The tractor must be stopped to select (A) range.

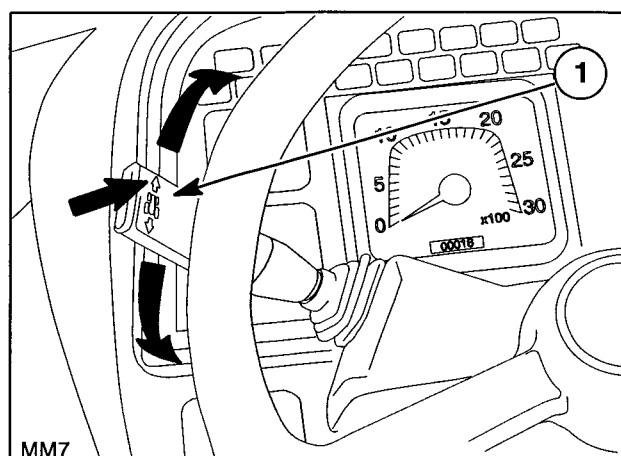


2-102

Shuttle Lever

The shuttle lever (1), located to the left of the steering wheel, is used to select forward or reverse travel when a gear ratio is engaged. To reverse the direction of travel, reduce engine and tractor speed, lift the shuttle lever against light spring pressure and move it forward for forward travel or rearward for reverse travel. It is not necessary to depress the clutch pedal when actuating the shuttle lever.

NOTE: A safety start switch prevents operation of the starting motor unless the forward/reverse (shuttle) lever is in neutral.



2-103

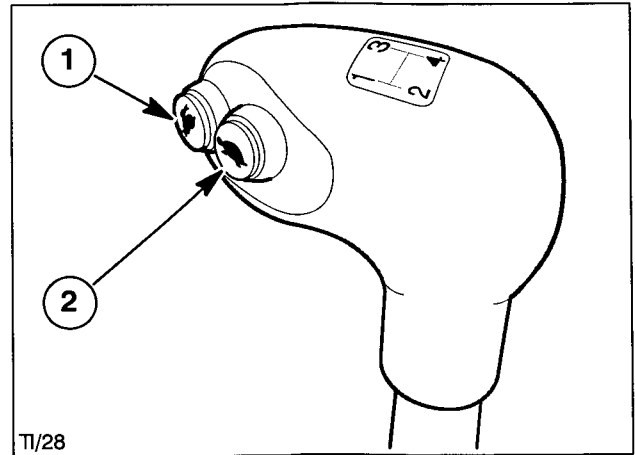
Direct/Underdrive Function

The hydraulically operated gear set within the transmission housing allows the operator to select underdrive in any forward gear while on the move. This, effectively, increases torque and reduces tractor speed by approximately 16.4%. It increases the number of forward gear ratios to 23.

NOTE: When operating in temperatures below 0° F (-18° C) with cold transmission oil, operate in underdrive and avoid shuttle operations, as far as practicable, until the oil has warmed up.

Direct drive/underdrive is hydraulically engaged, the valve is actuated by push button switches on the main gear shift lever. When changing from direct drive to underdrive or vice-versa, it is not necessary to use the clutch.

Press button (2) (tortoise symbol), to instantly engage underdrive, reducing tractor speed and increasing torque. Press button (1) (hare symbol) to shift to direct drive and increase tractor speed.



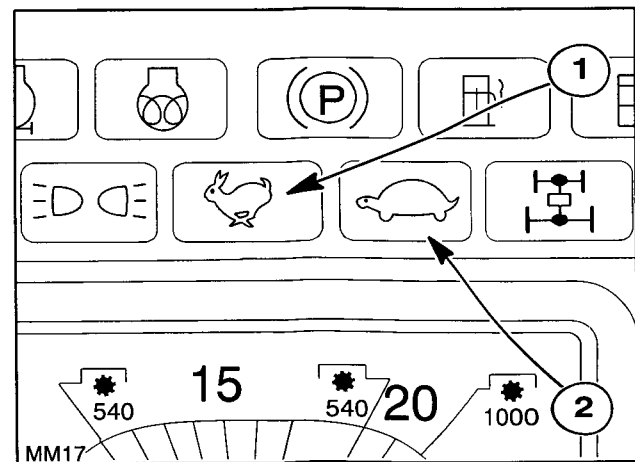
2-104

The amber indicator light (2), on the instrument panel will illuminate when the 'tortoise' button is pressed to select underdrive. The green indicator light (1) will illuminate when the 'hare' button is pressed to select direct drive. The lights also have tortoise and hare symbols on them to indicate low and high speeds.

NOTE: Reverse gears operate only in underdrive. When operating in a forward gear in direct drive, selection of a reverse ratio will cause the transmission function to automatically select underdrive.

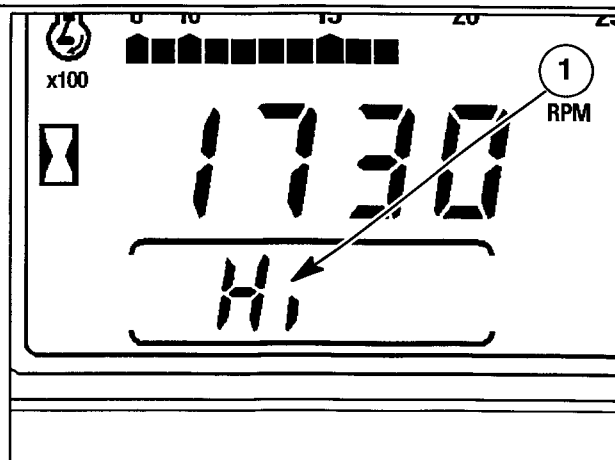


WARNING: To prevent inadvertent tractor movement, always stop the engine, place all gear shift levers in neutral and firmly apply the parking brake before leaving the tractor. The transmission will not prevent the tractor from rolling when the engine is shut off.



2-105

If the tractor is equipped with an electronic instrument console then "Hi" will be displayed (1) in the lower, central panel if direct drive is engaged. If underdrive is selected, then "Lo" will be displayed. "N" will be displayed when in neutral and "R" when reverse is selected.

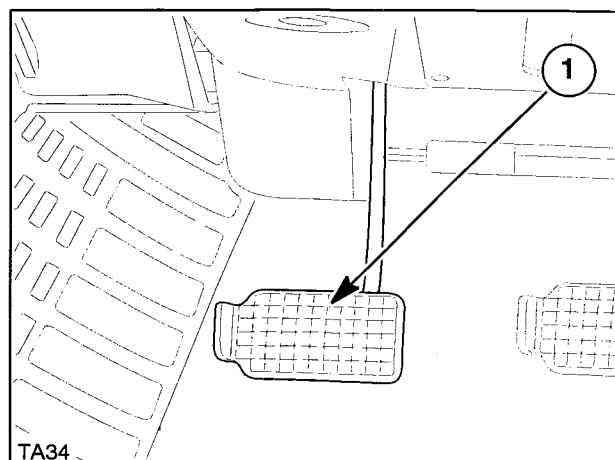


2-106

Clutch Pedal

IMPORTANT: Fully depress the clutch pedal when changing gear. Partially depressing the clutch pedal when changing gear may result in damage to transmission components. Also, when shifting down on the move, select the next consecutive gear to avoid damage to the transmission and/or overspeeding of the engine.

Depress the clutch pedal to disconnect power from the engine to the drive train. After the gear shift levers have been selected, slowly release the clutch to reengage power to the transmission. Always use the clutch when working in confined areas and when attaching to implements.



2-107

IMPORTANT: Tractors must **not** be tow started. When using a jumper battery to start the engine ensure that the polarity is correct **positive to positive, negative to negative**, otherwise the alternator may be damaged.

IMPORTANT: If it is necessary to tow the tractor, all shift **levers must** be in the **neutral position** and parking brake released otherwise damage to transmission components may occur.

IMPORTANT: To avoid premature wear, do not use the clutch pedal as a footrest.

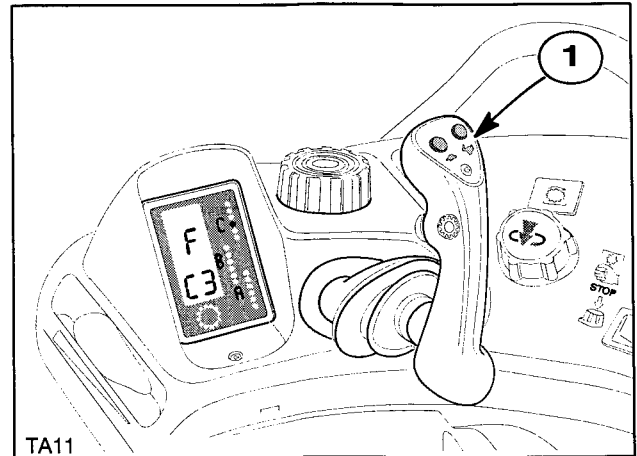
17 F/18 F x 6 R POWERSHIFT TRANSMISSION

The powershift transmission is an advanced design, controlled electronically by a computer module. The following transmissions are available:

- 18 forward and 6 reverse ratios – FWD
- 31 forward and 12 reverse ratios (with optional creeper gears) – FWD
- 17 forward and 6 reverse ratios – 2WD
- 30 forward and 12 reverse ratios (with optional creeper gears) – 2WD

Details of creeper gear operation will be found earlier in this section.

The transmission is operated by of a single power-shift control (1), incorporating three electrical push buttons that are used to make smooth upward or downward speed changes and range changes.

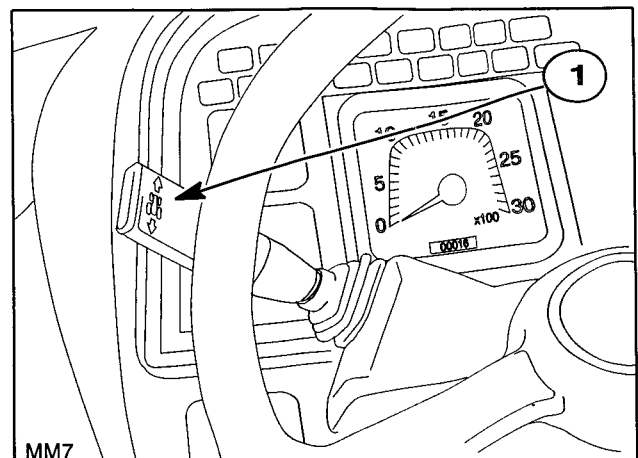


TA11

2-108

Selection of forward or reverse is by use of an electrically operated shuttle lever (1) located to the left of the steering column.

The powershift control and shuttle lever, as well as the throttle controls, are color-coded orange.



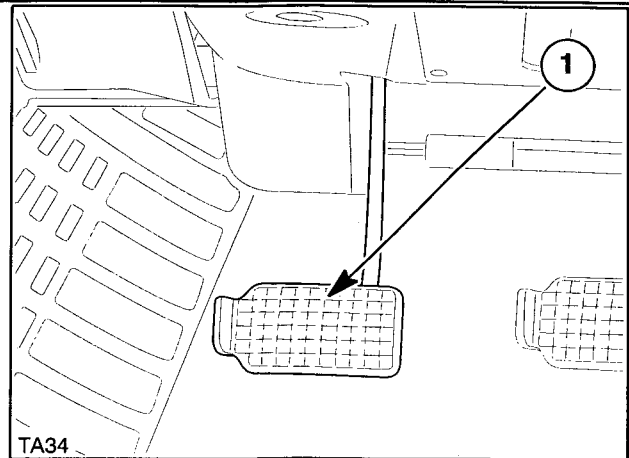
MM7

2-109

Clutch Pedal

A clutch pedal (1), is provided but is not required for gear, range or forward/reverse changes. The clutch pedal is required only for positioning the tractor to attach equipment or if operating in confined spaces when the low ratios do not provide a slow enough speed, at moderate/low engine speeds, to give precise control.

IMPORTANT: *To avoid premature wear, do not use the clutch pedal as a footrest.*

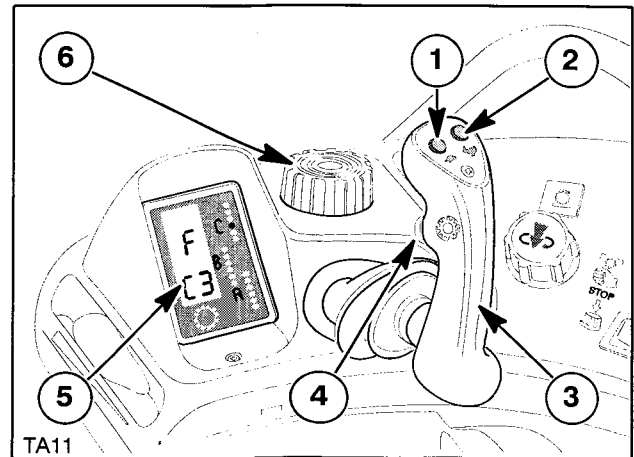


2-110

Powershift Control

The 18 F x 6 R transmission permits upward and downward gear changes on the move. In addition, the advanced design permits a change from one range to another while on the move.

The powershift control (3) is used to instantly select any of six gear ratios. Ratios 1 to 6 may be sequentially selected using the powershift UP button (2) or powershift DOWN button (1). The need to make a RANGE change is signalled by means of an audible warning when the limits of the powershift gears are reached. To change to the next higher range, hold in the powershift UP button (2) and press the RANGE button (4) or momentarily depress the clutch pedal. To change down a range, hold in the powershift DOWN button (1) and press the RANGE button (4) or momentarily depress the clutch pedal.



2-111

IMPORTANT: *When changing ranges under heavy draft loads the tractor may stop suddenly then restart.*

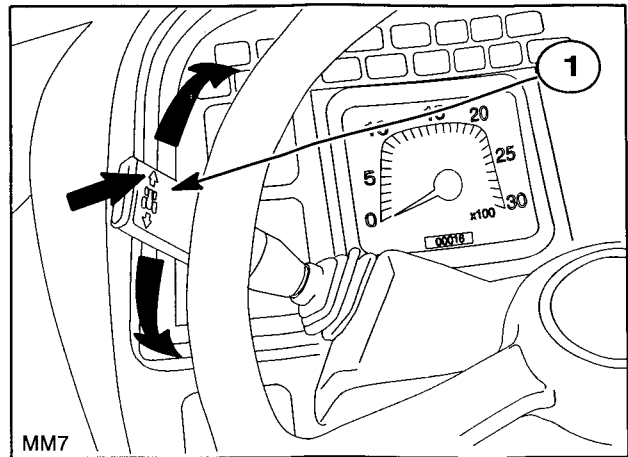
A digital display (5) and LED's next to the powershift lever will provide information on the range and gear selected.

The powershift control may be repositioned to suit the operator. Loosen the clamp knob (6), move the control to the most comfortable position then tighten the knob.

Shuttle Lever

The shuttle lever (1), located to the left of the steering wheel, is used to select forward or reverse travel. To reverse the direction of travel, reduce engine and tractor speed, lift the shuttle lever against spring pressure and move it rearwards. It is not necessary to depress the clutch pedal when actuating the shuttle lever.

WARNING: *To prevent inadvertent tractor movement, always stop the engine, place the shuttle lever in neutral and firmly apply the parking brake before leaving the tractor. The transmission will not prevent the tractor from rolling when the engine is shut off.*



2-112

Driving the Tractor

Start the engine with the shuttle lever (1), in neutral. The LCD on the instrument panel and adjacent to the Powershift control will display 'N' and 'B1'.

NOTE: *Safety start switches prevent operation of the starting motor unless the shuttle lever is in neutral and the clutch pedal is depressed.*

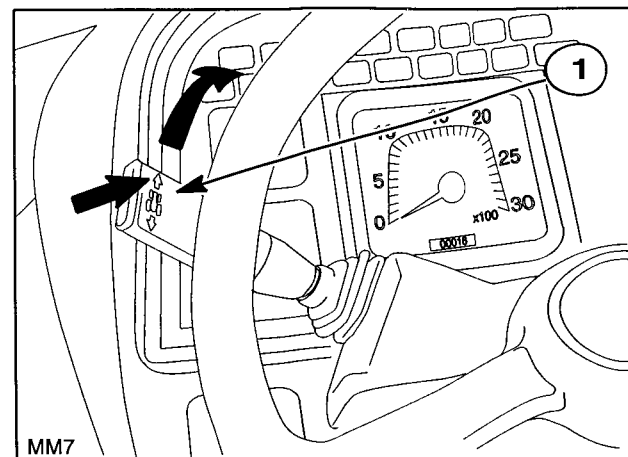
For forward travel, with the engine idling, lift the shuttle lever (1) and move it forward.

When the tractor is initially started, the electronic control will automatically select 1st. gear in range B for a smooth start.

Once moving, select the required ratio with the Powershift UP/DOWN and RANGE buttons, (2), (1) and (4), Figure 2-111 as previously described.

NOTE: *An alternative lower or higher ratio may be selected before moving. However, if a ratio higher than C1 is selected then the electronic control will select C1, this being the highest ratio permissible when moving from a standstill.*

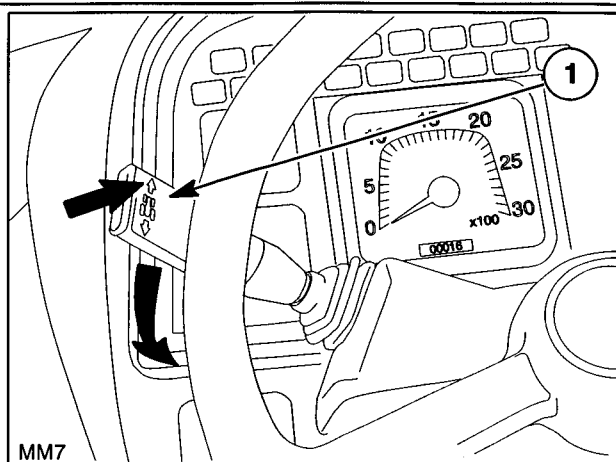
When changing up or down to an alternative range, the transmission will automatically select the nearest ratio for a smooth change. For example, if travelling forward in the highest ratio in range A (A6) when an upward range change is made, B2 will be selected.



2-113

To reverse the direction of travel, reduce engine speed, lift the shuttle lever (1) and move it rearwards.

When performing shuttle operations, the transmission will 'remember' the previously selected gear. For example, if travelling forward in C4 and the shuttle lever is moved to the reverse position, the transmission will select the highest ratio in reverse (R6). When the shuttle lever is moved forward again, the LED for ratio C4 will flash, but the nearest ratio (C1) will be selected and the C1 LED will glow. The transmission will then automatically change, sequentially to C2, C3 and then C4, at which point the C4 LED will stop flashing and become steady.



2-114

Speed Matching

When travelling on the road in range C, the transmission will automatically downshift to match engine speed to road speed if the following method is adopted.

Decrease engine speed, depress the inching pedal, simultaneously increasing engine speed by pressing the foot throttle further down. When the inching pedal is released, the transmission will automatically select a lower gear ratio (provided the lowest speed is not already selected) to approximately match engine speed to road speed.

If the tractor is stopped in the "C" range, the transmission will restart in "C1" and automatically speed match to the gear previously selected as the engine speed increases using the foot throttle.

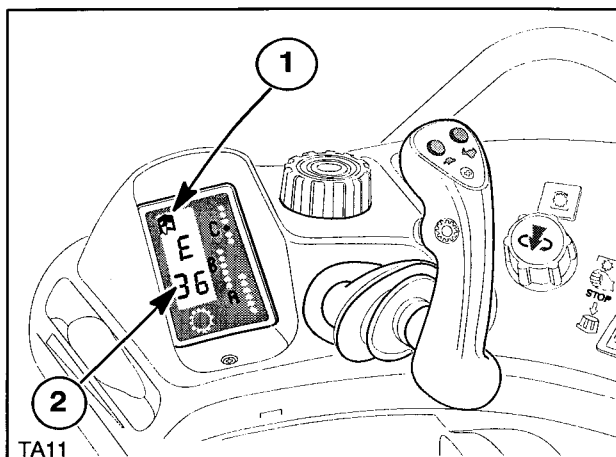
In the unlikely event of a fault occurring in the electronic transmission circuitry, the malfunction symbol (1) or warning light and a two-digit error code (2), preceded by the letter 'E' will flash in place of the transmission ratio display on the instrument panel.

The code indicates the faulty circuit or sensor and the type of fault, e.g., open circuit, short circuit, etc. In this event, the tractor will require the attention of your authorized dealer.

NOTE: When changing from forward to reverse travel, the nearest available ratio will be selected. As only range B is available in reverse, the ground speed in reverse gear may be different to the speed in the selected forward gear. For example, if C3 is selected in forward travel, then the nearest ratio R6 will be selected when the shuttle lever is moved to the reverse travel position.

NOTE: When operating in temperatures below -18°C (0°F) with cold transmission oil, avoid shuttle operations until the oil has warmed up.

IMPORTANT: The tractor cannot be tow started and must **not** be towed other than to remove it from a field or onto a trailer or truck. When using a jump start battery to start the engine ensure that the polarity is correct **positive to positive, negative to negative**, otherwise the alternator may be damaged. See 'Starting the Tractor with Jump Leads' on page 2-55.



2-115

Programming Reverse Gear Ratios

When changing from forward to reverse, the transmission will normally select the same ratio in reverse as was selected for forward travel. For special shuttle shift applications, 17 F/18 F x 6 F transmission offers the advantage of automatically changing the reverse gear ratio up to three ratios higher or lower than the engaged forward gear ratio.

To program an alternative reverse gear, proceed as follows:

- Turn the key-start switch off.
- Move the shuttle lever (1), to the reverse gear position.
- Press and hold down the upshift button (2).
- While holding down the upshift button, turn ON the key-start switch (but do not start the engine). The digital display (3), should show 'R and 0' (unless the transmission has previously been programmed to select a higher or lower reverse gear.)
- Release the upshift button. The transmission is now in the programming mode.

To program a higher reverse ratio:

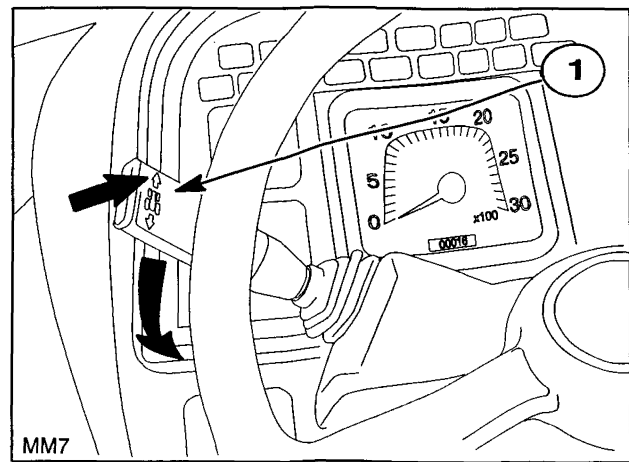
- Press the upshift button (2), one, two or three times, as required. The display will show 'R 1', 'R 2' or 'R 3'. This indicates that when reverse is selected the gear will be one, two or three ratios higher than the forward gear ratio.

To program a lower reverse ratio:

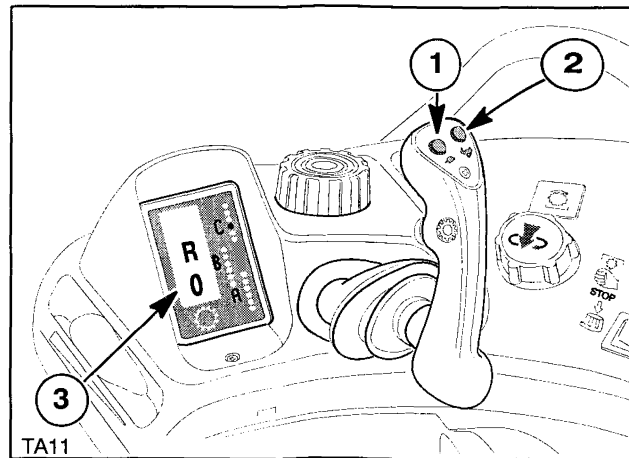
- Press the downshift button (1), one, two or three times, as required. The display will show 'R-1', 'R-2' or 'R-3'. This indicates that when reverse is selected the gear will be one, two or three ratios lower than the forward gear ratio.

To exit the program:

- Turn the key-start switch off. The transmission is now programmed.



2-116



2-117

NOTE: Remember that reverse gears are only available in 'B' range. Consequently, If traveling forward in range C, the transmission will always behave as if the highest ratio in B range (B6) is selected. If the transmission has been programmed to select 2 ratios lower in reverse, then R4 will be selected.

If traveling forward in range A, the transmission will always behave as if the lowest ratio in B range (B1) is selected. If the transmission has been programmed to select 2 ratios higher in reverse, then R3 will be selected.

CREEPER GEARS (where equipped)

For operations requiring extra low ground speeds, a reduction gear set (creeper gear) is available. The reduction gear set is installed within the main transmission housing and has a reduction ratio of 6:1.

As the name implies, the reduction gear set has the effect of reducing the ratios within the main transmission. Creeper gears will increase the number of available ratios as follows:

23 F x 6 R transmission

With creeper gears, the number of available ratios is doubled to:

46 forward and 24 reverse ratios.

18 F x 6 R transmission

With creeper gears, an additional 13 forward creeper gears and 6 reverse ratios are provided, making a total of:

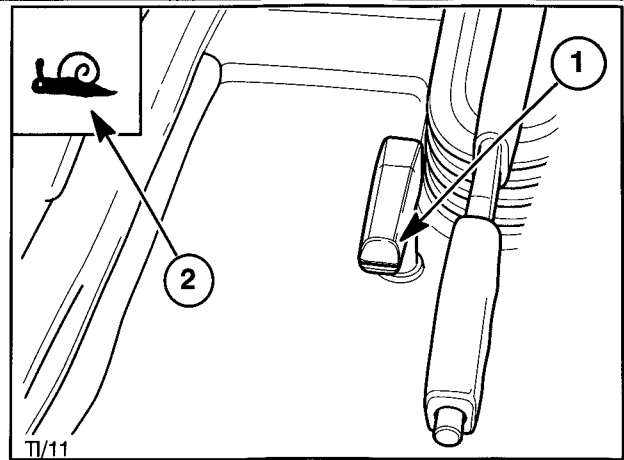
FWD – 31 forward and 12 reverse ratios

2WD – 30 forward and 12 reverse ratios

Creeper gear selection

To select the creeper gears, with the engine running and the tractor stationary, engage the required ratio/range. See previous text, according to transmission type. Pull the creeper gears selector (1), up to engage the creeper range. Push down to exit the creeper gear mode. Creeper gear selection is denoted by a snail (2) preceding the transmission ratio display on the display adjacent to the gear levers.

IMPORTANT: *Creeper gears offer very low ground speeds. Do **not** use the low gearing advantage to apply excessive draft loads to the tractor. Do **not** use creeper gears in the high range for operations requiring full engine power.*



2-118

GROUND SPEED DECALS

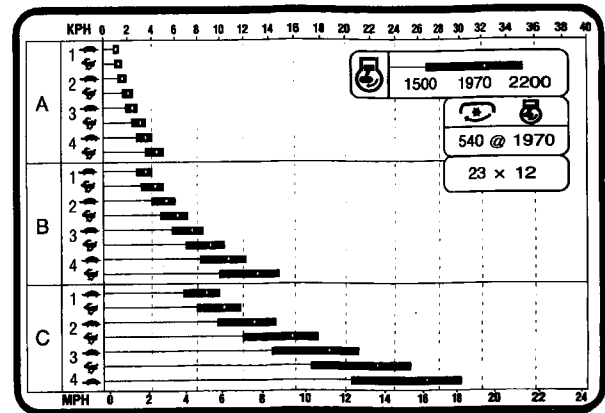
A decal similar to one of those shown is affixed to the lower, front corner of the right-hand window or, if the tractor does not have a cab, on the trim to the right of the seat. The decals illustrate the approximate ground speed in all ratios at three alternative engine speeds.

The left-hand side of each decal shows the main shift and range lever positions. The main area of the decal contains a number of black blocks representing the ground speeds available in each of the gear ratios.

The left edge of each block represents an engine speed of 1500 rev/min. and the right-hand edge rated speed (2200 rev/min). A white dot in the centre of each block depicts the engine speed at which the 540 rev/min. P.T.O. speed of is obtained (1970 rev.min).

Example 1 (23 F x 12 R transmission):

To find the ground speed at 2200 engine rev/min. in 4th gear range B, underdrive, follow the right-hand edge on the B4 'tortoise' block, up to the kph line or down to the MPH line. In the example shown, the ground speed indicated is 8.3 MPH or 13.3 kph.



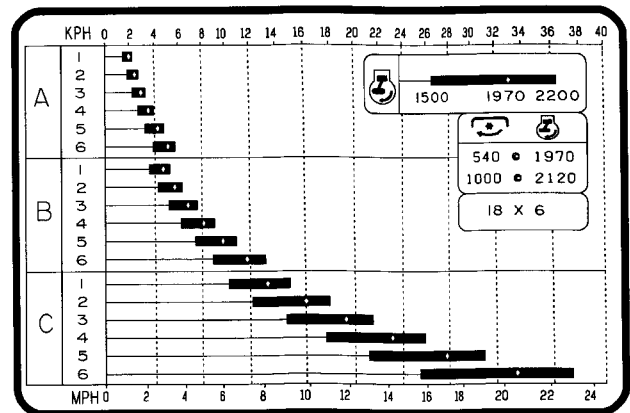
2-119

Example 2 (18 F x 6 R transmission):

To find the ground speed at 2200 engine rev/min. in 5th gear range C, follow the right-hand edge on the C5 block, up to the kph line or down to the MPH line. In the example shown, the ground speed indicated is 19.2 or 31 kph MPH.

Ground Speeds

The ground speed of your tractor will be displayed on the instrument panel. If your tractor is equipped with radar then the ground speed displayed will be a true reading. Tractors without radar will display a ground speed that is subject to minor inaccuracies due to the effects of wheel slip, tire pressures, change of tire size, etc.



2-120

ELECTRONIC MANAGEMENT UNIT

The electronic management unit controls the differential lock and front wheel drive functions. Dependent upon tractor specification level, switches with 3 or 4 touch pads may be installed. The basic unit with 3 touch pads is shown in Figure 2-121. Figure 2-122 illustrates the unit with 4 touch pads.

Front and Rear Differential Lock

Front wheel drive tractors have a differential lock installed in the front and rear axles to lock all four wheels together in conditions where wheel slip may be encountered.

NOTE: Two wheel drive tractors will have a non functional FWD pad with differential lock in the rear axle only.

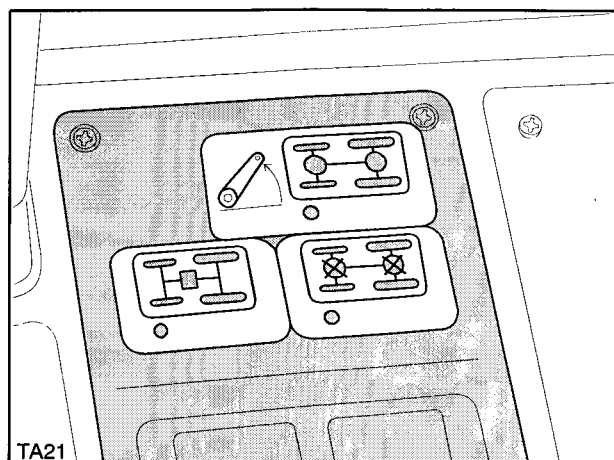
The differential locks are activated by two touch pads on the electronic management unit located on the right-hand console. Touch a pad and a single 'beep' will be heard from the alarm and the LED in the corner of the touch pad will illuminate.

Dependent upon tractor specification, differing modes are available, as follows:

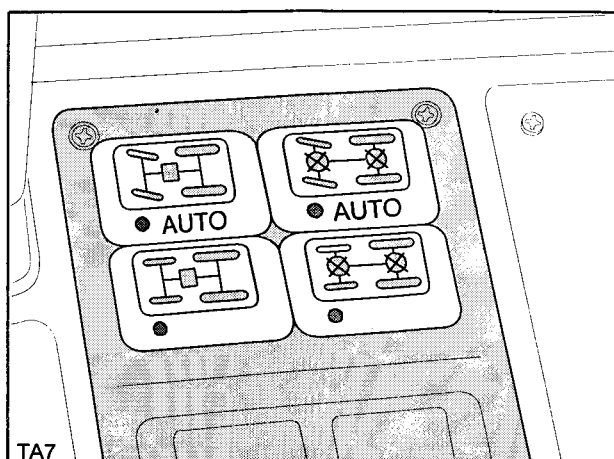
- Manual mode (all models)
- Semi-automatic mode (3-pad unit only)
- Fully automatic mode (4-pad unit only)

WARNING: Avoid using the differential lock at speeds above 5 MPH (8km/h) or when turning the tractor. When engaged, the differential lock will make steering the tractor very difficult.

IMPORTANT: If wheelspin is encountered, avoid shock loads to the transmission by reducing engine speed before engaging the differential lock.



2-121



2-122

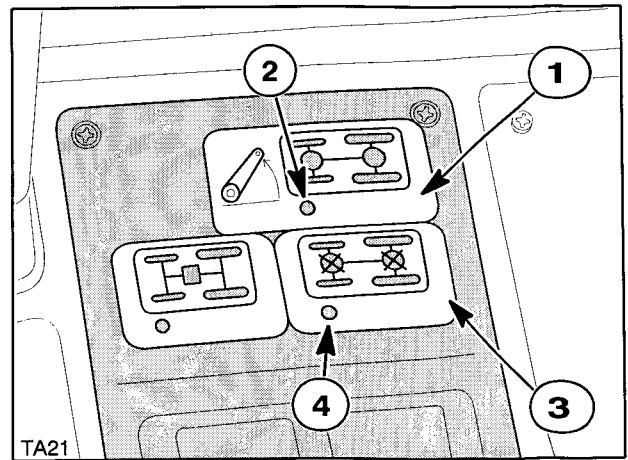
Manual Mode (all models)

Touch the pad (3) Figure 2-123 or 2-126. The alarm will give a single 'bleep' and the LED (4) in the corner of the pad will illuminate to indicate that the manual differential lock mode is selected. The indicator light (1) Figure 2-124 on the instrument panel will also illuminate.

Disengagement occurs as follows:

One or both brake pedals applied

Touch the pad a second time



2-123

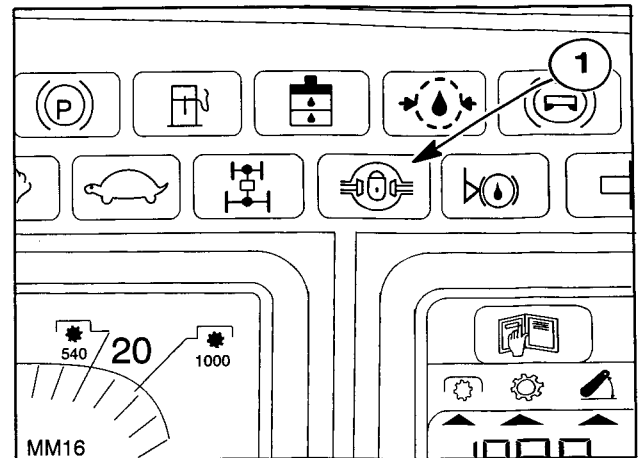
NOTE: Disengagement will only occur when traction at the rear wheels equalizes.

Semi-automatic Mode (3-pad unit only)

Touch the pad (1) Figure 2-123. The alarm will give a single 'bleep' and the LED (2) in the corner of the pad will illuminate to indicate that the semi-automatic differential lock mode is selected. The indicator light (1) Figure 2-124 on the instrument panel will also illuminate but only remain on while the differential locks are actually engaged. Disengagement occurs as follows:

Either brake pedal applied (single pedal braking) temporary disengagement

Touch the pad a second time



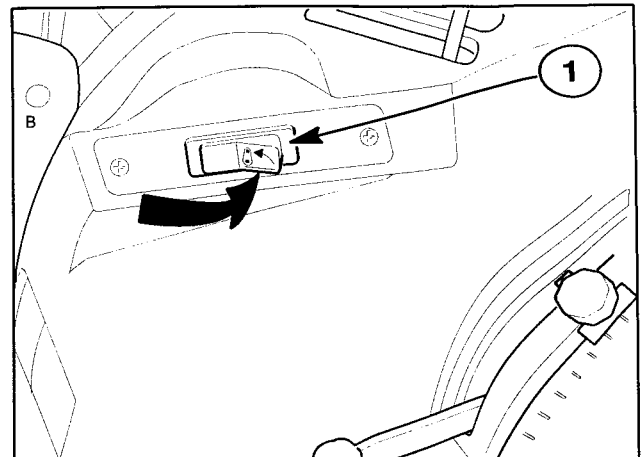
2-124

FAST RAISE/WORK

switch (1) activated temporary disengagement (to raise the rear 3-point linkage) (will re-engage when 3-point linkage is lowered)

NOTE: If the semi-automatic mode is selected with the FAST RAISE/WORK switch already in the raised position, the differential locks will engage but disengage when the fast raise switch is subsequently used to raise the 3-point linkage.

NOTE: Disengagement will only occur when traction at the rear wheels equalizes.



2-125

Fully Automatic Mode (4-pad unit only)

To engage both differential locks in the automatic mode, touch the pad (1). The alarm will give a single 'bleep' and the LED (2) in the corner of the pad will illuminate to indicate that the automatic differential lock mode is selected. The indicator light (1) Figure 2-124, on the instrument panel will also illuminate but only remain on while the differential locks are actually engaged. Disengagement occurs as follows:

Either brake pedal	temporary
applied (single pedal braking)	disengagement

Tractor steering angle greater than 20°	temporary
and speed less than 6 MPH (10 km/h)	disengagement

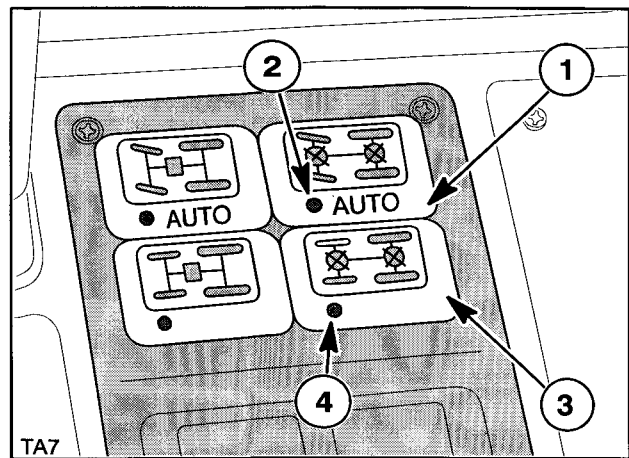
Tractor steering greater than 10°, tractor speed within the range of 6 – 9 MPH (10 – 15 km/h)	temporary
	disengagement

FAST RAISE/WORK

switch (1) Figure 2-125 activated (to raise the rear 3-point linkage)	temporary
	disengagement
	(will re-engage when 3-point linkage is lowered)

NOTE: If the automatic mode is selected with the fast raise switch already in the raised position, the differential locks will engage but disengage when the fast raise switch is subsequently used to raise the 3-point linkage.

Tractor speed exceeds 9 MPH (15 km/h)	differential lock will disengage
---------------------------------------	----------------------------------

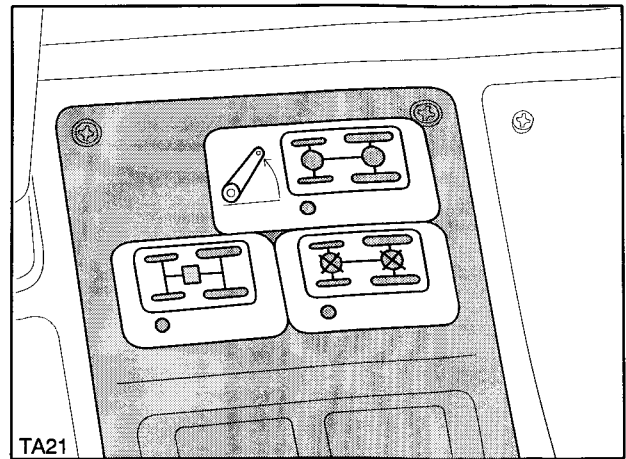


2-126

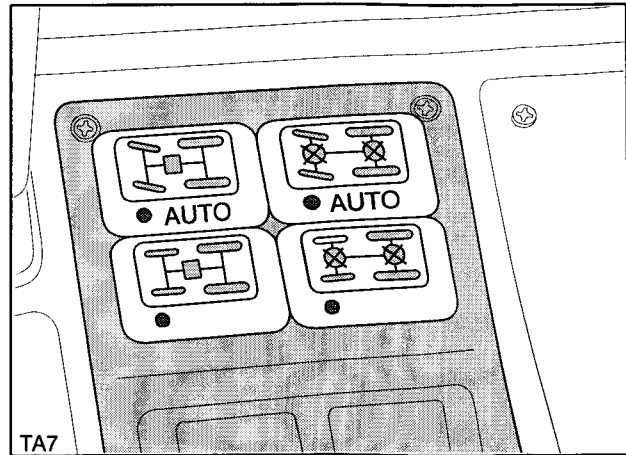
Front Wheel Drive (where equipped)

Front wheel drive can be engaged and disengaged in all gears (forward and reverse) during operation and under full load.

If your tractor is equipped with front wheel drive, one or two touch pads are provided, dependent upon tractor specification level. The pad(s) is/are on the electronic management unit located on the right-hand console.



2-127



2-128

The installation of both pads provides a choice of operating modes:

- Manual (all models)
- Automatic (if equipped).

Manual Mode

To engage front wheel drive in the manual mode, touch the pad (1). The LED (2) in the corner of the pad will illuminate to indicate that four wheel drive is engaged. The indicator light (1) Figure 2-131 on the instrument panel will also illuminate.

Touch the pad a second time to disengage front wheel drive.

Automatic Mode (4 pad unit only)

To engage front wheel drive in the automatic mode, touch the pad (4). The LED (3) in the corner of the pad will illuminate to indicate that front wheel drive is engaged.

The indicator light (1) Figure 2-131, on the instrument panel will turn off and on again during automatic disengagement and engagement of the drive to the front wheels.

In the automatic mode front wheel drive is engaged and disengage under the following circumstances:

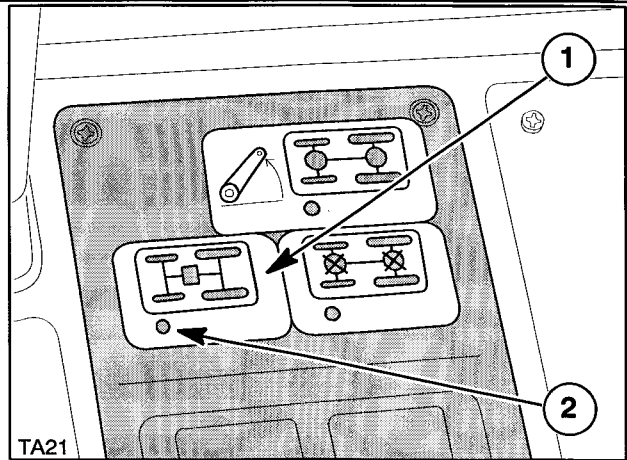
Tractor steering angle greater than 35° and speed less than 6 MPH (10 km/h)	temporary disengagement
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Tractor steering angle greater than 25°, tractor speed within the range of 6 – 12 MPH (10 – 20 km/h)	temporary disengagement
--	-------------------------

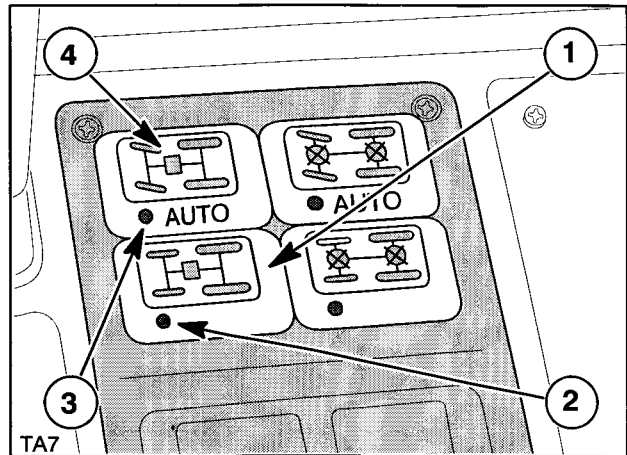
Tractor speed exceeds 12 MPH (20 km/h)	temporary disengagement
--	-------------------------

Touch the pad a second time to disengage front wheel drive.

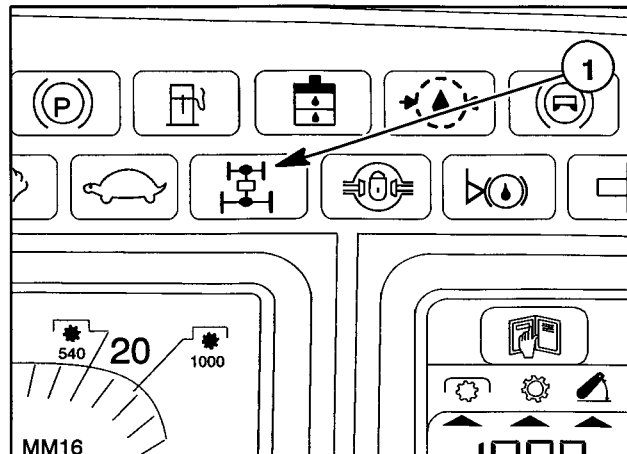
NOTE: For improved braking performance, FWD will automatically engage whenever both brake pedals are depressed.



2-129



2-130



2-131

FWD Operating Precautions



CAUTION: *Front wheel drive greatly increases traction. Extra caution is needed on slopes. Compared to two-wheel drive, a FWD tractor maintains traction on steeper slopes, increasing the possibility of overturning.*

When driving on icy, wet or gravel surfaces, reduce speed and make sure the tractor is correctly ballasted to avoid skidding and loss of steering control.

IMPORTANT: *To avoid excessive tire wear when traveling on the public highway or any hard surface, it is recommended that front wheel drive be disengaged. Always use front/rear tire combinations specified to ensure acceptable tire wear.*



WARNING: *Tractors with front wheel drive engaged or disengaged should not be allowed to exceed 25 MPH (40 km/h). Overspeeding by towing or coasting downhill with clutch depressed or transmission in neutral may cause loss of control, personal injury to the operator or bystanders or failure of the drive shaft.*

Keep the tractor in the same gear going downhill as would be used when going uphill.



WARNING: *On front wheel drive tractors, the drive to the front axle is automatically engaged when the brakes are applied to provide four wheel braking. Operators should be aware of the effectiveness of four wheel braking which greatly enhances braking performance. Appropriate care should be exercised during hard braking*

Front tires should never be inflated above the recommended pressure. Make sure that the manufacturers' recommendations are not exceeded.

POWER TAKE-OFF

The power take-off (P.T.O.) transfers engine power directly to mounted, semi-mounted or trailed equipment via a splined shaft at the rear of the tractor.

The P.T.O. is a 540/1000 two-speed, system. with inter-changeable shafts. A 6 spline P.T.O. output shaft of 1.375 in. (34.9 mm) diameter is supplied, designed to operate at 540 rev/min.

A 21-spline shaft of 1.375 in. (34.9 mm) diameter, designed to operate at 1000 rev/min., is also supplied with the tractor.

A 20 spline shaft of 1.75 in. (44.45 mm) diameter, designed to operate at 1000 rev/min. is available from your dealer.

The P.T.O. may be engaged or disengaged whether the tractor is moving or stationary. Rotation of the shaft is independent of the transmission or tractor ground speed and is related directly to the speed of the engine.

Attaching P.T.O. Driven Equipment

WARNING: Before attaching or detaching equipment or changing the P.T.O. shaft:

- Firmly apply the parking brake.
- Ensure that **all** gearshift levers are in neutral.
- Stop the engine, turn the P.T.O. selector knob to the off position (fully counterclockwise) and wait until the P.T.O. and equipment stops before getting off the tractor.

Mount or hitch the equipment to the tractor as outlined in THREE-POINT LINKAGE on page 2-98 and SWINGING DRAWBARS on page 2-107.

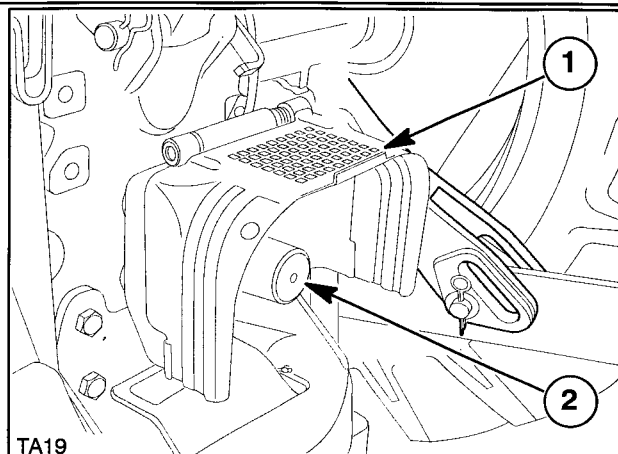
The flip-up P.T.O. guard (1), has a special spring-loaded hinge that will retain the guard in any one of several points between the horizontal and fully raised positions.

A plastic P.T.O. cap (2) is also supplied.

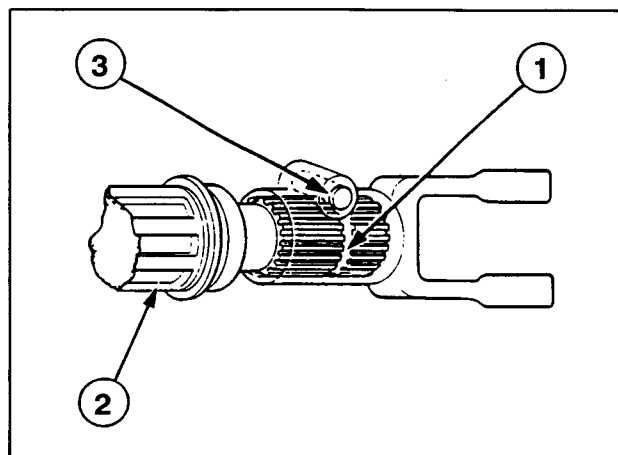
To connect P.T.O. driven equipment to the P.T.O. shaft:

1. Tilt the guard upward, as necessary for access.
2. Pull the plastic P.T.O. cap from the shaft and store.
3. Attach the implement to the P.T.O. shaft
4. To ensure that the implement driveshaft coupler lock pin (3) or detent balls engage the groove (1) in the P.T.O. shaft (2).
5. If the coupler does not have a locking arrangement, pin the coupler to the shaft.
6. Lower the guard.

IMPORTANT: After attaching mounted equipment, carefully raise and lower using Position Control and check clearances and P.T.O. shaft slide range/articulation. When attaching trailed equipment, ensure the drawbar is correctly set. See 'Swinging Drawbar' on page 2-107.



2-132



2-133

P.T.O. Operating Precautions



WARNING: *Whenever operating P.T.O. equipment, observe the following precautions:*

- *Check that you are using the correct P.T.O. speed for the implement. Follow the instructions in the equipment operator's manual.*
- *Ensure that the P.T.O. guard is installed when using P.T.O. driven equipment.*
- *Do not wear loose clothing when operating P.T.O. driven equipment.*
- *Firmly apply the parking brake, place all gearshift levers in neutral and block all four wheels before operating any stationary P.T.O. equipment.*
- *Do not approach, clean or adjust P.T.O. driven equipment while the tractor engine is still running. Shut off the tractor engine, turn the P.T.O. selector knob to the off position (fully counterclockwise) and wait until the P.T.O. and equipment stops before getting off the tractor or working on the P.T.O. or equipment*

Operating 2-Speed P.T.O. with inter-changeable shaft

Your tractor is equipped with a 6-spline P.T.O. shaft designed to operate at 540 rev/min. An alternative 21-spline shaft, for use with 1000 rev/min P.T.O. equipment, is also supplied.

P.T.O. driven equipment not having a high power requirement is designed to run at 540 P.T.O. rev/min and will have a 6-spline female coupling. A P.T.O. shaft speed of 540 rev/min is obtained at an engine speed of 1969 rev/min.

Equipment having a high power requirement is designed to operate at 1000 P.T.O. rev/min and will be provided with a 21-spline female coupling. With the 21-spline shaft installed, run the engine at 2120 rev/min to provide a P.T.O. speed of 1000 rev/min.

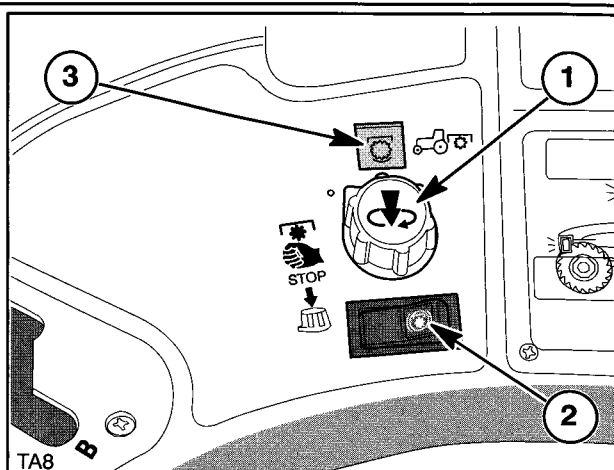
IMPORTANT: *Implements with a high power requirement should be operated with the 1000 rev/min. P.T.O. (21-spline shaft). If it is necessary to use the 6-spline shaft (at 540 rev/min.) to operate implements having a power requirement of more than 65 horsepower, then it is strongly recommended that the implement is equipped with a slip clutch to avoid damage to the P.T.O. output shaft and other tractor components.*

NOTE: *When required, change the P.T.O. shaft to suit the operation and equipment in use, as described under 'Changing the P.T.O. Output Shaft' on page 2-77.*

Starting the P.T.O.

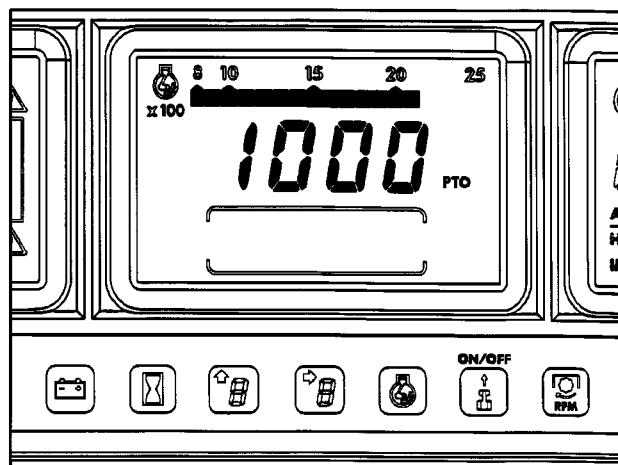
IMPORTANT: To avoid shock loads to the P.T.O., reduce engine speed to approximately 1000 rev/min when engaging the P.T.O., then increase engine speed by means of the throttle to obtain the required P.T.O. speed.

- With the engine turning at less than 1000 rev/min, press down the selector knob (1) and turn fully clockwise to engage the P.T.O. The adjacent warning light (3) will illuminate to signify engagement of the P.T.O.
- Open the throttle to obtain the required engine/P.T.O. speeds.



2-134

NOTE: If your tractor has an analogue/electronic or electronic instrument console, the P.T.O. shaft speed can be displayed. The light (3) will be illuminated when the P.T.O. is engaged. If overspeeding of the P.T.O. occurs (P.T.O. speed exceeds 630 rev/min) the light will flash for 5 seconds, then remain steady. When the 1000 rev/min/shaft is in use, the light will also flash (but may be ignored) as P.T.O. shaft speed passes through the 630 rev/min range. The light will flash again at 1170 P.T.O. rev/min to indicate that overspeeding has occurred in the 1000 rev/min P.T.O. range.



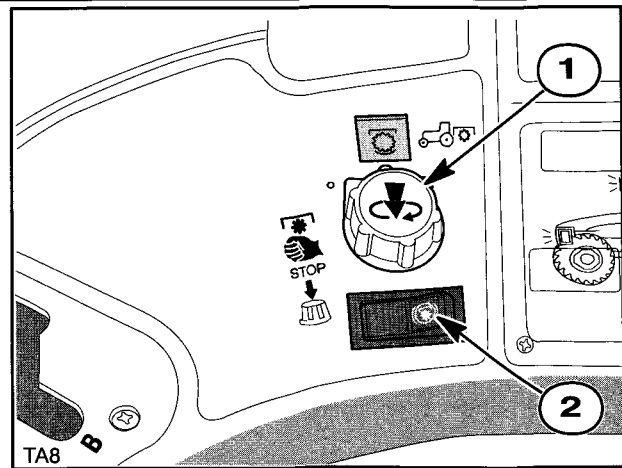
2-135

- To disengage the P.T.O., tap the P.T.O. selector knob (1), sharply downwards and it will spring back to the disengaged position (counterclockwise).

IMPORTANT: An automatic P.T.O. brake is installed to stop shaft rotation quickly when the P.T.O. is disengaged. To avoid overstressing the P.T.O. brake, slow down the implement by reducing engine speed **before** disengaging the P.T.O. This is particularly important with implements having a high inertia. Such implements should, ideally, be equipped with an overrun clutch. To avoid damage to the brake when operating high inertia implements, hold down the brake switch (2), and allow the implement to come to rest naturally.

NOTE: When the engine is stopped or if it is stalled, the P.T.O. will automatically disengage. However, the selector knob (1) must still be returned manually to the 'off' position (fully counterclockwise) otherwise the P.T.O. will not engage when the engine is restarted.

WARNING: To avoid inadvertent movement of the implement, disengage the P.T.O. after each use.



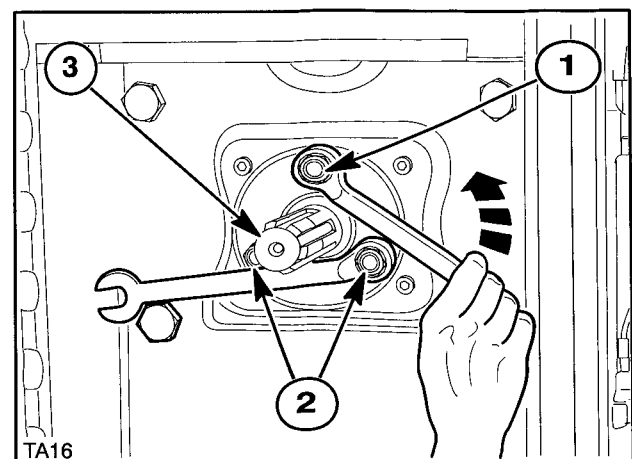
2-136

Changing the P.T.O. Output Shaft

Unscrew the three nuts (1) and (2) and remove the shaft assembly (3). To loosen the nuts, position a box end wrench on one of the nuts so that it is braced against a convenient projection. Use a second wrench, as shown, to loosen the adjacent nut.

Ensure that the replacement shaft is thoroughly clean before installation. Following the removal procedure, in reverse, tighten the three securing nuts to a torque of 120 lbf/ft. (162 Nm).

Protect the removed shaft by wrapping in a clean cloth and place in the tool box.



2-137

HYDRAULIC SYSTEM

INTRODUCTION

Your tractor is equipped with a hydraulic system providing accurate and sensitive control over a wide range of operating conditions.

The electronically controlled hydraulic system senses changes in the draft loading, electronically, via sensors in the lower links of the 3-point linkage.

The hydraulic system is a closed center load sensing (CCLS) type. The main advantage of the CCLS system is that hydraulic capacity is increased and the hydraulic pump only supplies oil when required so power losses are reduced when the demand is low.

POSITION AND DRAFT CONTROL

Position Control provides accurate and sensitive control of implements, such as sprayers, rakes, mowers, etc., that operate above the ground. Once set, Position Control will maintain the selected implement height. Position Control may also be used with ground-engaging equipment. However, unless

the field is truly flat, it cannot be recommended. When in Position Control, the tractor and implement become, in effect, a rigid unit and irregularities in the surface of the land will cause the tractor/implement combination to rise and fall.

Draft Control is most suitable for mounted or semi-mounted implements operating in the ground. Changes in the working depth or changes in soil resistance cause the draft loading on the implement to increase or decrease.

The change in draft loading is sensed electronically. Special pins are used to connect the lower links to the rear axle housing. These pins send an electrical signal to the computer which, in turn, signals the hydraulic system to respond by raising or lowering the implement to restore the original draft loading. In this way a uniform draft load is maintained on the implement.

The tractors have the additional benefit of Dynamic Ride control. This system minimises implement bounce when transporting heavy implements on the 3-point linkage. See page 2-89.

ELECTRONIC DRAFT CONTROL

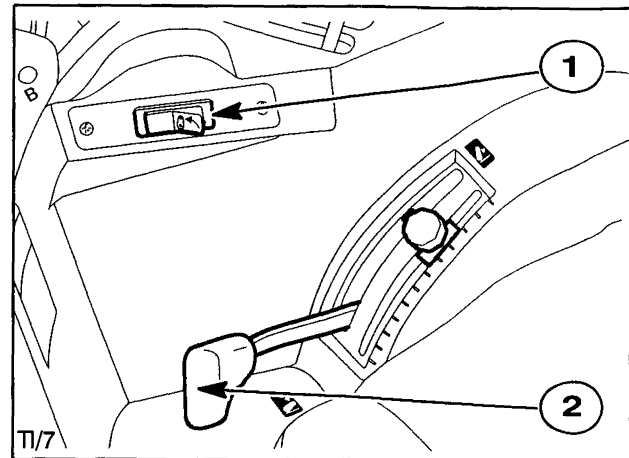
This system senses draft variations through the lower links and, using an electronic computer, translates these variations to the hydraulic system which raises and lowers the links to maintain a constant draft loading. The smoothness and accuracy provided during operation gives the system a clear advantage over conventional mechanical systems.

The electro-hydraulic Draft and Position Control system is operated from a console to the right of the operator's seat, housing the lift control lever, (2) and rotary control knobs, Figure 2-139. A liquid crystal display (LCD) on the instrument panel shows precise linkage position. Two warning displays (LCD's) and/or warning lights are also provided.

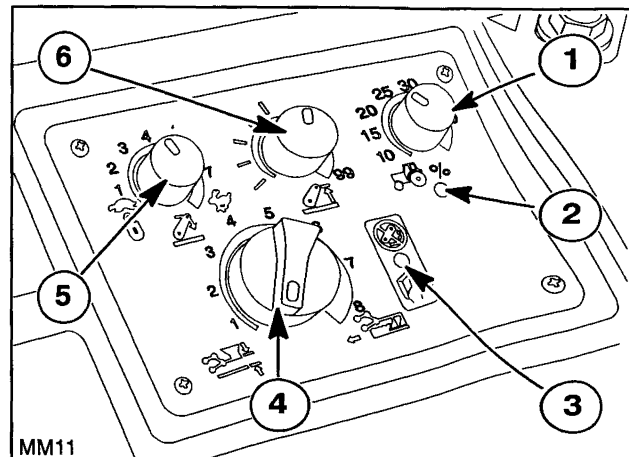
The lift control lever (2), which controls implement height or working depth, is a low effort type, having no direct coupling to the hydraulic system.

The FAST RAISE/WORK switch (1), enables the operator to rapidly raise the implement at the headland to the position set by the height limit control (6) Figure 2-139 and to lower the implement back down to the position set by the lift control lever, without disturbing the settings. During normal operation the front of the switch is pressed fully in, as shown in Figure 2-138.

The switch has three positions. When in the central position, it allows external fender, electrical switches to become active. These switches, one on each rear light assembly, permit the hydraulic linkage to be raised and lowered by the operator, while standing beside the tractor, to aid attachment and detachment of implements.



2-138



2-139

The Position/Draft sensitivity knob (4), is used to select Draft Control, Position Control or a combination of the two in order to make the system more or less sensitive to changes in the draft loading. A decal encircling the knob has eight numbered positions, to indicate the degree of sensitivity selected. Turn the Position/Draft sensitivity knob towards the full Position Control setting (position 1) to decrease the system's response to a change in draft loading. The knob is detented at the Position Control setting (position 1 - knob fully counterclockwise).

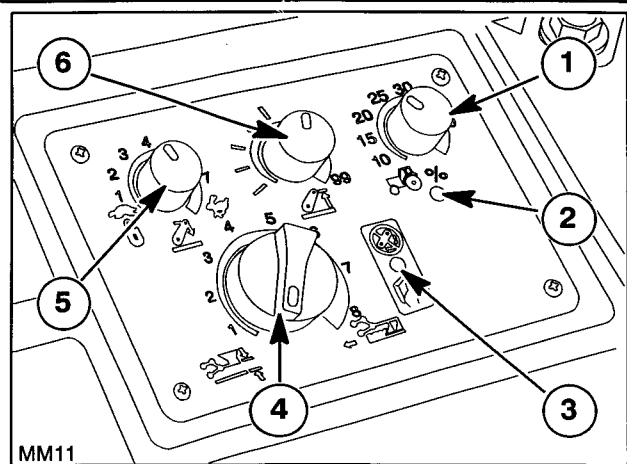
IMPORTANT: Always set the Position/Draft sensitivity knob to the full Position Control setting (position 1) at any time when not actually operating in Draft Control, such as when attaching equipment, transporting equipment or when no equipment is attached.

The drop rate control knob (5), controls the speed at which the lower links and implement drop during a lowering cycle. This knob has a decal encircling it with seven numbered positions. Position 1 is the slowest rate and is denoted by a 'tortoise' symbol. Position 7 is the fastest setting, denoted by a 'hare' symbol.

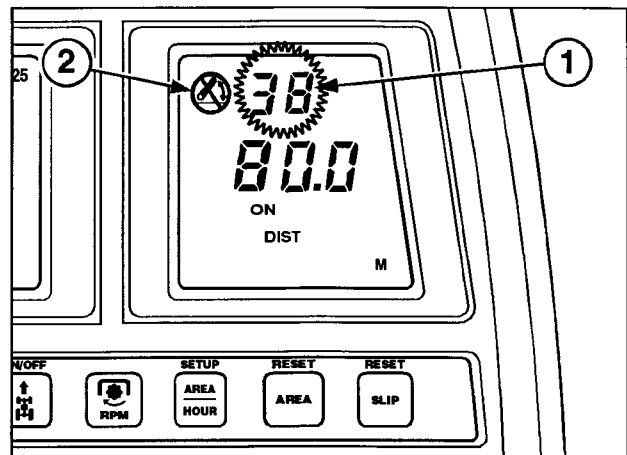
The malfunction warning light (3) Figure 2-140, serves two purposes:

- **Steady light** signifies 'hitch disabled'. The 'hitch disabled' warning is repeated on the instrument panel as an LCD symbol (2) (electronic instrument console) or as a warning light (2) Figure 2-142 (analogue/electronic instrument console).

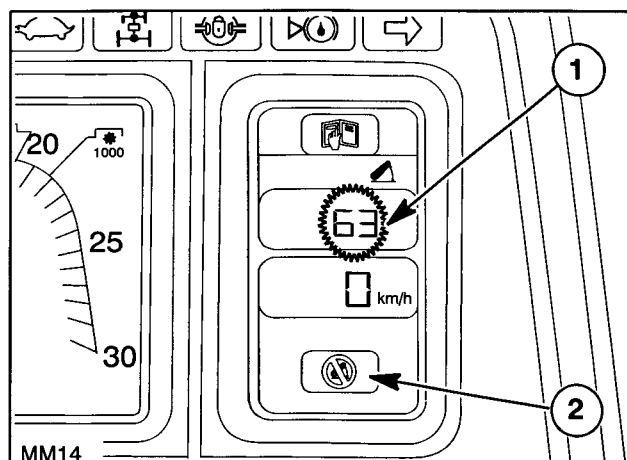
- **Flashing light** means that there is a malfunction in the system circuits. Again, this is repeated on the instrument panel as an LCD symbol (2), Figure 2-141, or as a warning light (2). In addition, a two-digit diagnostic error code (1) will flash in the space normally used to display implement position. Should a fault occur, consult your authorized dealer advising the diagnostic code displayed.



2-140



2-141



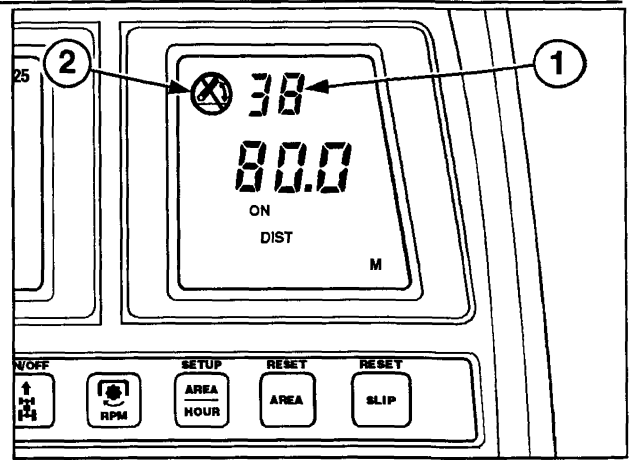
2-142

OPERATION

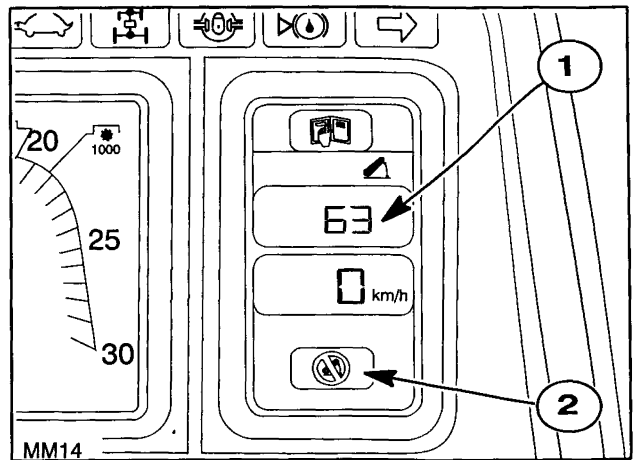
The 'hitch disabled' LCD symbol or warning light, (2), signifies that the lift control lever position does not correspond to the position of the lower links so the 3-point linkage cannot be raised or lowered by the lift control lever. The 'hitch disabled' warning will display if:

- The 3-point hitch lever and external linkage position are not in phase.
- The lift control lever has been inadvertently moved with the engine stopped.
- The 3-point lift external linkage has moved since the tractor was last operated. The linkage dropped slightly.

NOTE: Always lower the 3-point implement fully before stopping engine.

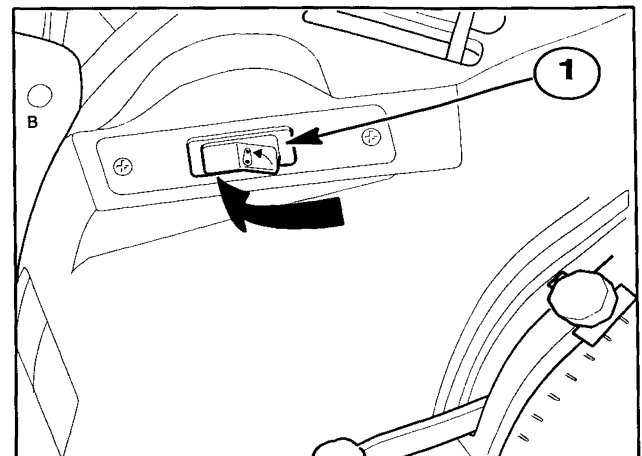


2-143



2-144

- The FAST RAISE/WORK switch (1), has been activated (central position) in order to transfer control of the hydraulic power lift to the external switches.



2-145

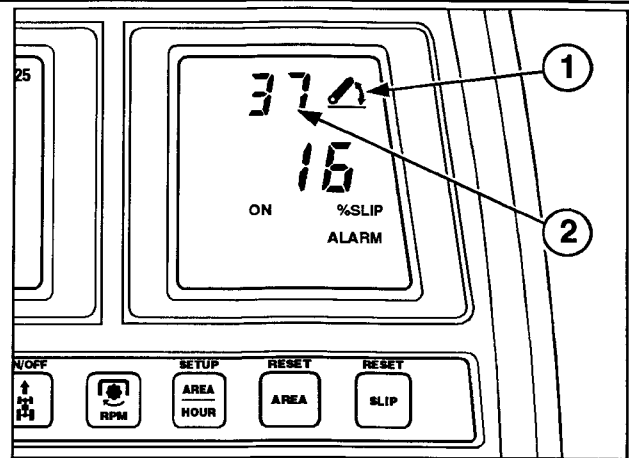
Hitch Capture

To put the lift control lever back in phase with the lower links (capture), ensure that the FAST RAISE/WORK switch (1) Figure 2-148, is in the 'lower' position, as shown, pull the lift control lever fully rearwards and push forward again, more slowly, to allow the lift linkage to lower.

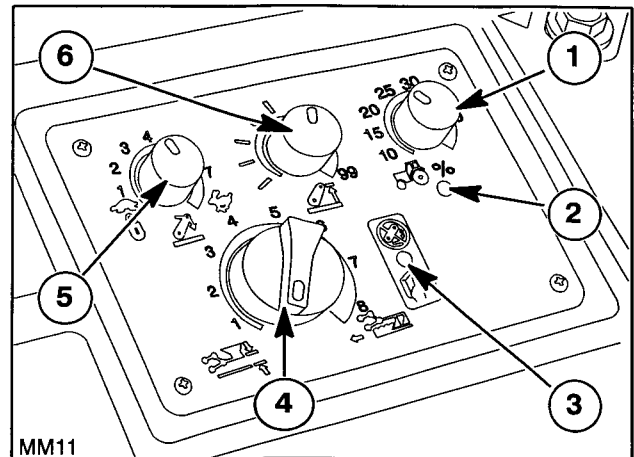
The hitch enabled symbol (1) will be displayed to advise the operator when the 3-point linkage is in phase with the lift control lever. In the event of the 3-point linkage/lift control lever becoming out of phase with one another, this display will disappear and the hitch disabled symbol will display (2), Figure 2-143.

The digital display on the instrument panel (2) Figure 2-146 or (1) Figure 2-144, indicates the position of the lower links using a scale of '0' to '99'. A display of '0' indicates that the links are fully lowered and a display of '99' indicates they are fully raised.

The height limit control knob (6), limits the height to which the linkage may be raised. Adjust this knob to avoid the possibility of a large implement damaging the tractor when fully raised.



2-146

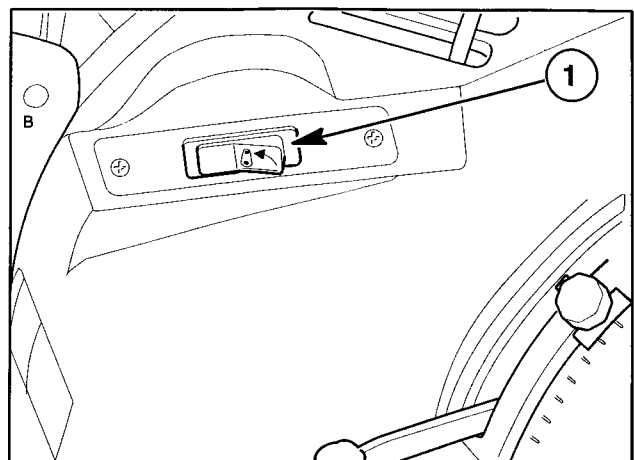


2-147

Fast Raise/Work Switch

The FAST RAISE/WORK switch (1), enables the operator to rapidly raise the implement at the headland to the position set by the height limit control and to lower the implement back down to the position set by the lift control lever, without disturbing the settings.

To raise the implement, press the rear of the switch ('lift arm raise' symbol) fully in. Press the front end of the switch fully in to lower the implement to the operating position. The central switch position is to transfer control of the hydraulic power lift to the external switches.



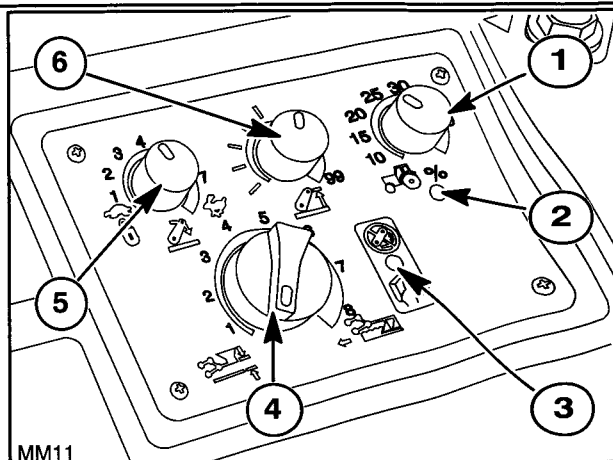
2-148

NOTE: The implement will not lower if ground speed exceeds 15 MPH (24 km/h).

Slip Limit Control (Optional)

The slip limit control knob (1), available only with the optional radar sensor unit, enables the operator to limit the amount of wheel slip. If wheel slip exceeds the limit set by the control knob, the implement will raise until wheel slip is reduced to an acceptable level. The knob is detented at the 'off' position (knob fully clockwise). A digital display of wheel slip, combined with a slip alarm may be programmed into the electronic instrument panel module. See ELECTRONIC INSTRUMENT CONSOLE on page 2-31.

NOTE: The slip limit 'on' indicator (2), will illuminate when slip control is activated and the implement is raising to restore the selected slip rate.



2-149

Draft Control Operation

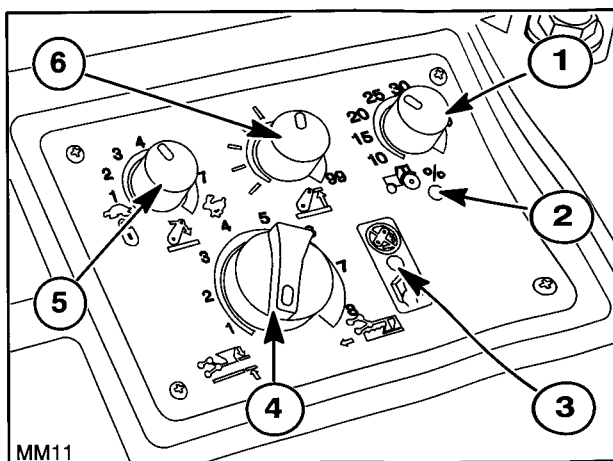
To operate in Draft Control, adjustment of the Position/Draft sensitivity knob (4), and drop rate knob (5) is required. The following table may be used as a guide to enable you to adjust the settings to suit the implement and field conditions:

Implement/Soil	Position/Draft Knob
Fully mounted	- clay soil 3 - 5
	- sandy soil 2 - 4
Semi-mounted	- clay soil 6 - 8
	- sandy soil 5 - 7

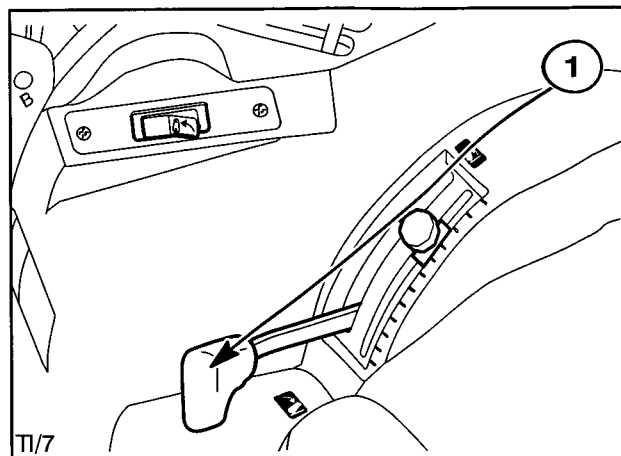
Position 8 on the Position/Draft sensitivity knob (fully clockwise, decal indicating plow engaged with soil) is the most sensitive draft setting and variations in soil density will cause the hydraulic system to respond with large movements of the linkage and attached implement.

Turning the Position/Draft sensitivity knob counter-clockwise (towards position 1) will progressively decrease the magnitude and rate of linkage movement relative to variations in soil density.

Drive the tractor into the field and lower the implement into the soil by pushing the lift control lever (1), forward. The further forward the lever is moved, the greater the draft loading will be. In most circumstances, forward movement of the lever will increase working depth, rearward movement will reduce working depth until the implement rises out of the ground.



2-150



2-151

OPERATION

Dependent upon the position of the lift control lever relative to the lower links, the speed of lift will automatically adjust, being faster if there is a great differential and slowing as the lower links come closer to the position set by the lift control lever. This means that if a large movement of the lift control lever is made then the lower links will respond by moving rapidly. As the links approach the position set by the lift control lever, movement will slow.

Set the implement drop rate by rotating the drop rate control knob (5). Turn the knob clockwise (towards the 'hare' symbol) to increase the speed of drop. Turn the knob counterclockwise (towards the 'tortoise' symbol) to slow down the drop rate.

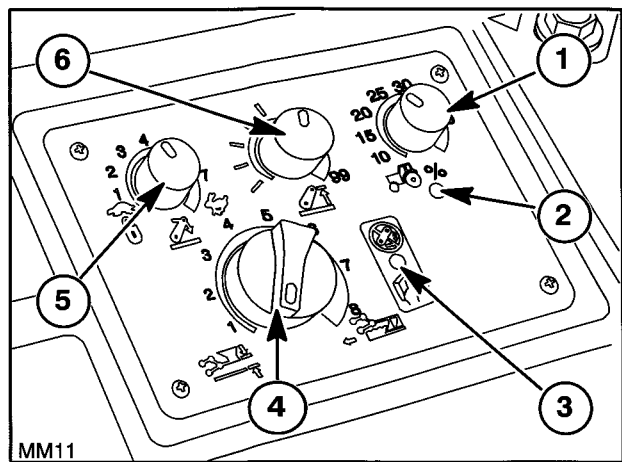
IMPORTANT: When first setting the implement up for work, keep the drop rate control knob in the slow drop position ('tortoise' symbol).

Once set, the tractor hydraulic system will automatically adjust implement depth to maintain an even pull (draft load) on the tractor and so reduce wheel slip to a minimum.

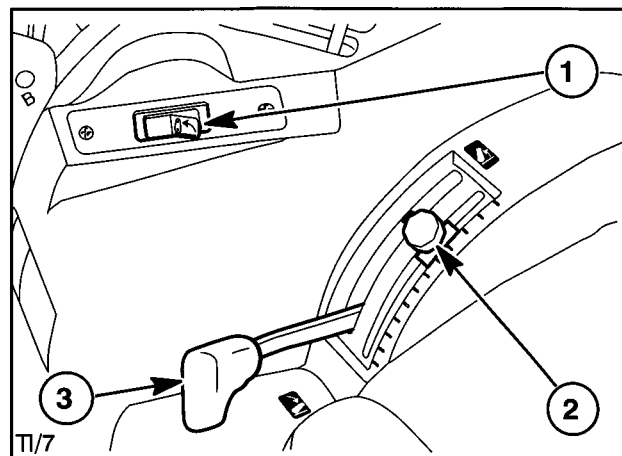
Observe the implement as it pulls through the ground. If hydraulic system reaction is too great, reduce sensitivity by turning the Position/Draft sensitivity knob (4), counterclockwise a few degrees. If implement movement is still too great, progressively rotate the knob counterclockwise (toward the Position Control setting) to further reduce sensitivity to a level suited to the soil conditions.

NOTE: The full Position Control setting is not recommended for soil-engaging implements.

Once the required implement working depth has been established there is no need to move the lift control lever again until the work is completed. Upon reaching the headland, press the rear of the FAST RAISE/WORK switch (1) fully in to lift the implement to the position set by the height limit control knob. When re-entering the working area, press the front of the switch fully in and the implement will lower to the depth originally set by the lift control lever (3).



2-152

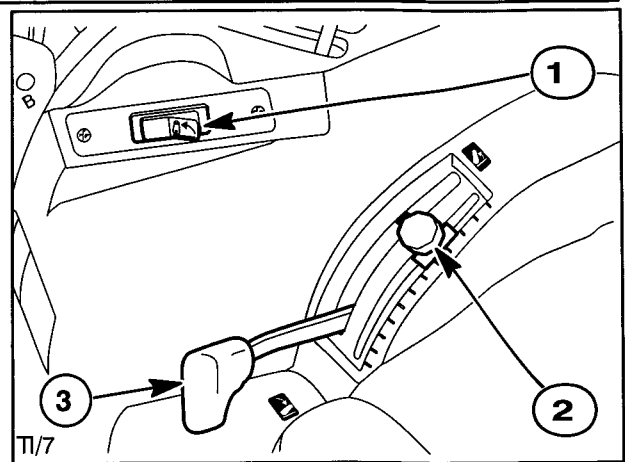


2-153

OPERATION

The adjustable stop (2), should be used to set the implement depth. When the required implement depth has been established, loosen the knob on the stop and move it so that it is against the front edge of the lift control lever (3). Retighten the knob. Whenever the implement is raised, it will always return to the same working depth when the lever is pushed forward to contact the stop.

NOTE: If required, the lift control lever may be eased sideways (to the right) to bypass the adjustable stop.

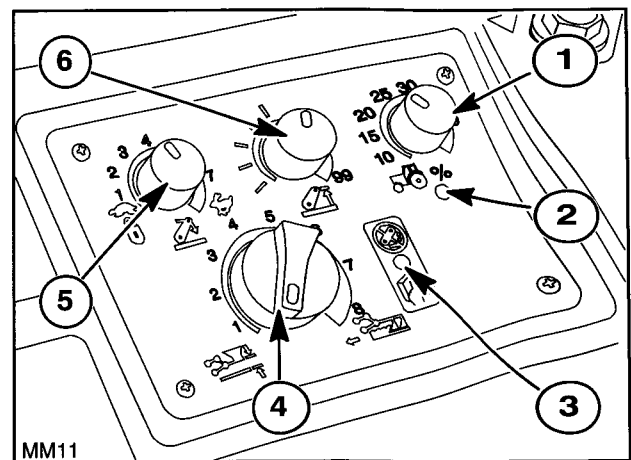


2-154

Position Control Operation

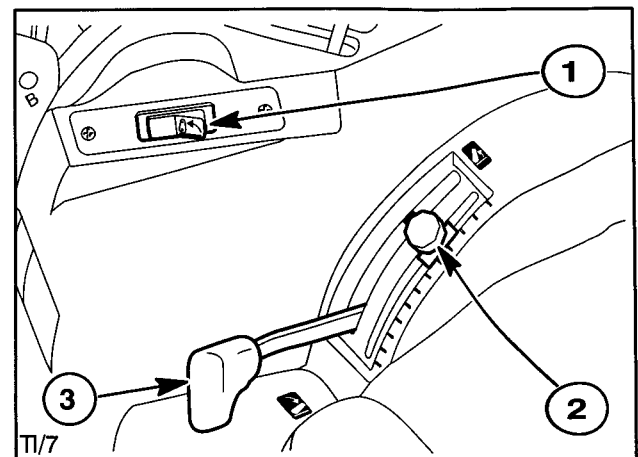
To operate in Position Control, turn the Position/Draft sensitivity knob (4), fully counterclockwise to position 1 (decals depicts an implement above the ground).

Raise the implement in stages, ensuring that there is at least 4 in. (100 mm) clearance between the implement and any part of the tractor. Note the digital display reading on the instrument panel. If the reading is less than '99' it means that the implement is not fully raised. Adjust the height limit control knob (6), to prevent the linkage being raised further and so avoid the possibility of the implement damaging the tractor when fully raised.



2-155

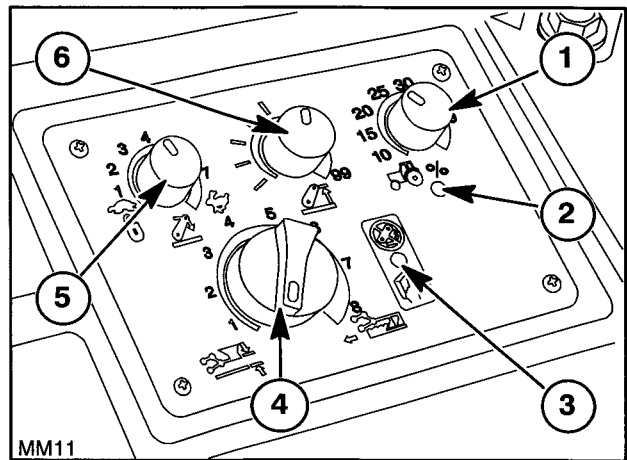
Set the required implement height using the lift control lever (3). Pull the lever back to raise the implement. Push forward to lower.



2-156

OPERATION

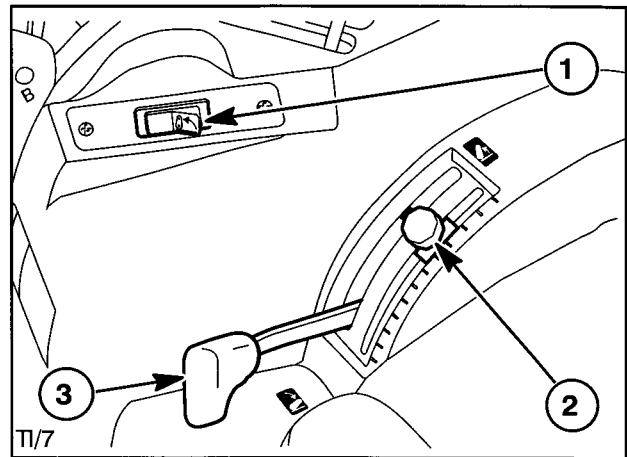
Adjust the rate of implement drop by rotating the drop rate knob (5). Turn the knob clockwise to speed up the drop rate or counterclockwise to slow down the drop rate.



2-157

Once the required implement working depth has been established there is no need to move the lift control lever again until the work in hand is completed. Upon reaching the headland, press the FAST RAISE/WORK switch (1) to fully lift the implement to the position set by the height limit control knob. When re-entering the working area, press the switch again and the implement will lower and return to the depth originally set.

Use the adjustable stop (2), to maintain the required implement depth, as described in Draft Control Operation.



2-158



WARNING: When transporting equipment on the 3-point linkage, select Position Control, raise the implement and set the adjustable stop (2) against the front edge of the lift control lever to prevent accidental forward movement of the lever which could result in attached equipment lowering and becoming damaged, damaging the road surface or causing personal injury.

External Hydraulic 3-Point Hitch Controls

An external, rocker type switch is provided on each rear light assembly (1). The switches have three positions and are spring-loaded to return to the central, off position.

Before leaving the tractor to operate the external switches:

- Apply the parking brake
- Move the gearshift levers to neutral
- Disengage the P.T.O.

WARNING: Do not stand on or near the implement or between the implement and tractor when operating the external hydraulic power lift controls.

Move the hand throttle lever to the low idle position (fully rearwards) and push the hydraulic lift control lever (3), fully down. Move the FAST RAISE/WORK switch (1) to the central position. This will transfer control of the hydraulic power lift to the switches located on the rear light assemblies.

WARNING: Before using the external hydraulic power lift switches, ensure that no person or object is in the area of the implement or 3-point linkage.

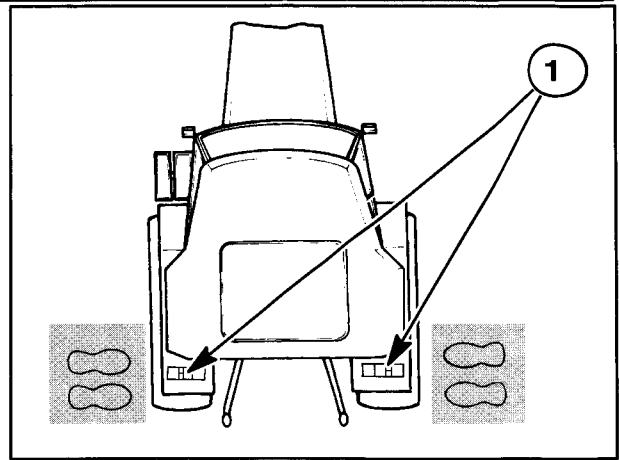
Never operate the external switches while standing:

- Directly behind the tractor or tires
- Between the lower links
- On or near the implement

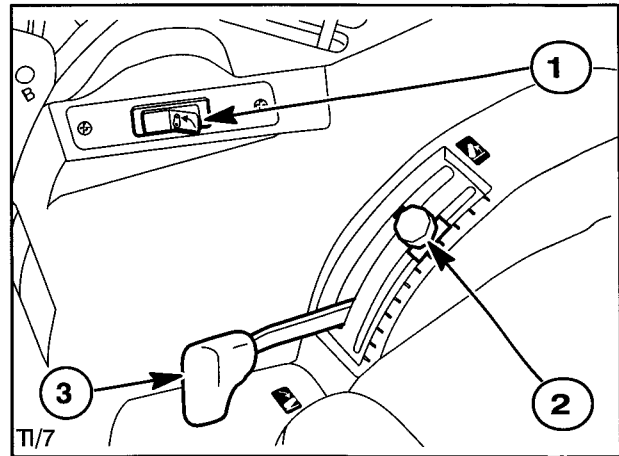
WARNING: Never extend arms, legs, any part of the body or any object into the area near the 3-point linkage or implement while operating the external switch.

WARNING: Never have an assistant working the opposite set of controls. When moving to the opposite set of controls, move around the tractor or implement. Do not cross between the implement and tractor.

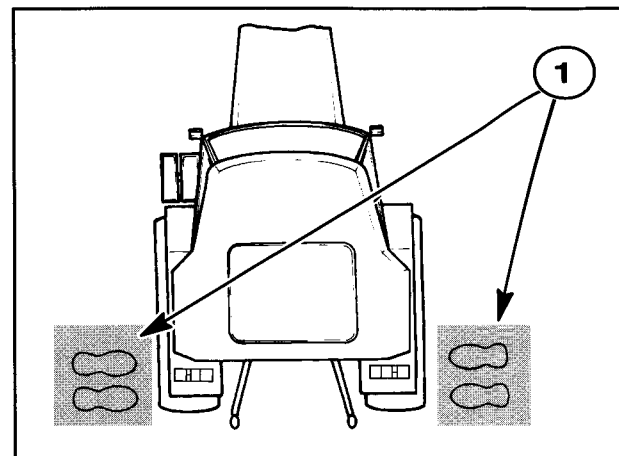
The operator must only activate the external switches while standing to the side of the tractor (outboard of the rear tires) – the shaded area (1).



2-159



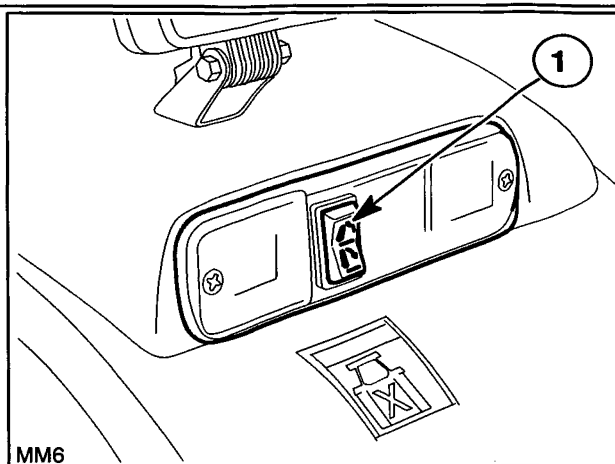
2-160



2-161

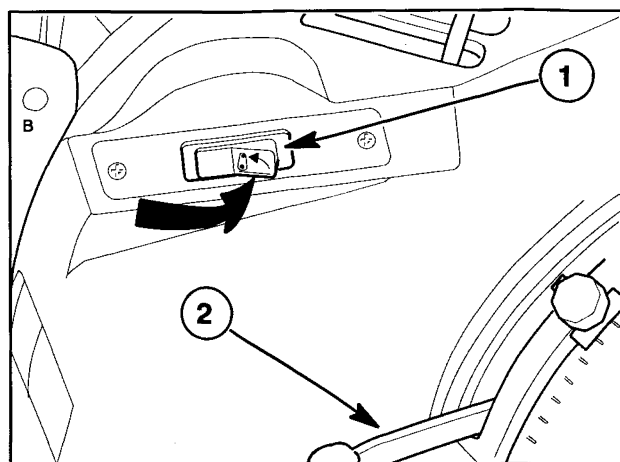
OPERATION

Pressing the upper part of the rocker switch (1), will cause the lift linkage to slowly raise. Pressing the lower part will cause the linkage to lower. When the lower links align with the implement, release the switch which will spring return to the central 'off' position. Attach the implement to the 3-point linkage in the normal way.



2-162

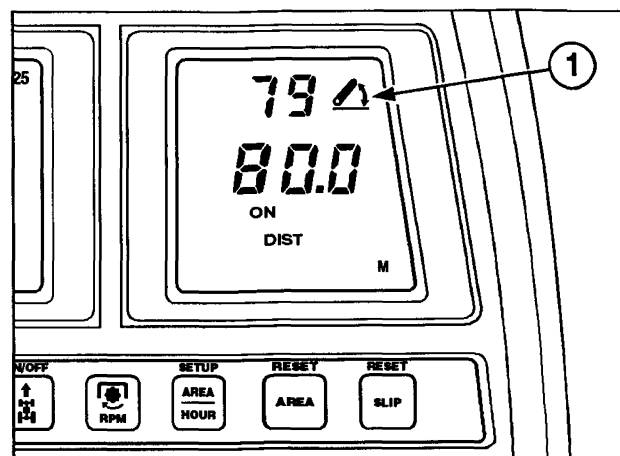
To transfer control of the hydraulic power lift back to the lift control lever, press the front of the FAST RAISE/WORK switch (1), fully in. Pull the lever (2) fully rearwards and push forward again, more slowly.



2-163

The hitch enabled symbol (1), will display indicating that the 3-point linkage is in phase with the lift control lever.

IMPORTANT: When control of the 3-point linkage is transferred back to the lift control lever, an attached implement may raise fully and damage the rear of the cab. Operator's should be aware of this and take appropriate action to stop raising before full lift height is reached.

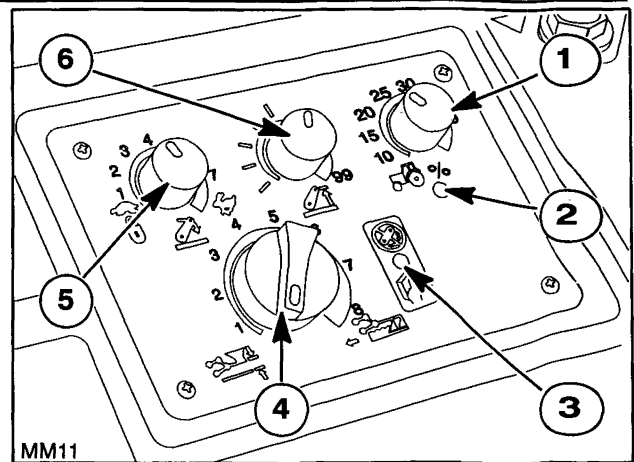


2-164

Transport Lock and Dynamic Ride Control

When transporting equipment on the 3-point linkage, turn the drop rate control knob (5), fully counterclockwise to the transport lock position (padlock symbol). This will prevent the implement from accidentally lowering and damaging the road surface.

Additionally, when transporting equipment on the 3-point linkage, implement bounce can lead to lack of steering control at transport speeds. With Dynamic Ride Control selected, when the front wheels hit a bump, causing the front of the tractor to rise, the hydraulic system will immediately react to counter the movement and minimize implement bounce to provide a smoother ride.

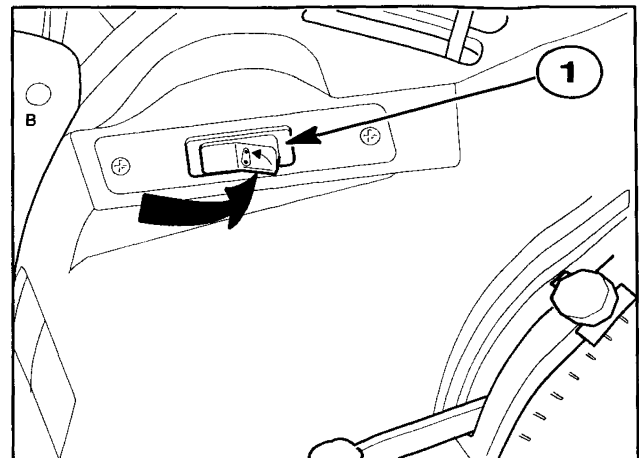


2-165

To engage Dynamic Ride Control:

1. Select Position Control by turning the knob (4) fully counterclockwise.
2. Fully depress the rear of the FAST RAISE/WORK switch (1) to raise the implement to the height set by the height limit control (6) Figure 2-165.
3. Turn the drop rate control knob (5) Figure 2-165, fully counterclockwise to the transport lock position (padlock symbol).

Dynamic Ride Control will only operate at speeds above 5 MPH (8 kph). When tractor speed exceeds 5 MPH (8 kph), the implement will drop by 4 – 5 points (displayed on the instrument console) when the hydraulic system makes corrections to counteract implement bounce. When tractor speed falls below 5 MPH (8 kph) the implement will raise again to the height set by the height limit control and Dynamic Ride Control will become inoperative.



2-166

REMOTE CONTROL VALVES

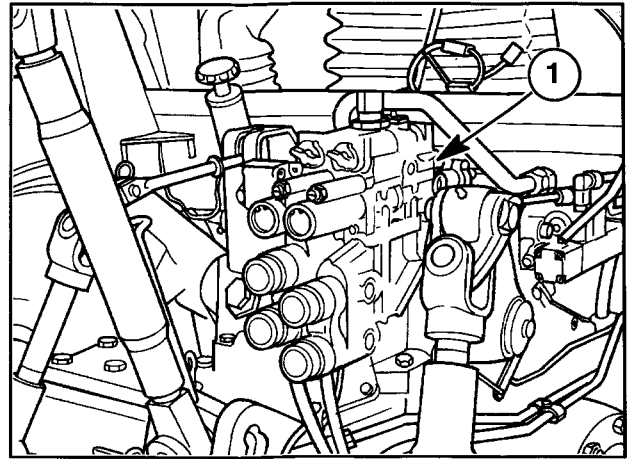
WARNING: Hydraulic fluid or diesel oil escaping under pressure can penetrate the skin causing serious injury.

- Do **not** use your hand to check for leaks. Use a piece of cardboard or paper to search for leaks.
- Stop the engine and relieve pressure before connecting or disconnecting lines.
- Tighten all connections before starting the engine or pressurising lines.

If any fluid is injected into the skin, obtain medical attention immediately.

The remote control valves (1) are closed center, load-sensing.

The valves are used to operate external hydraulic cylinders, motors etc. Up to four remote control valves may be installed and are located centrally at the rear of the tractor. Valves I and II are installed to the right of the hydraulic top link, valves III and IIII to the left.

**2-167**

OPERATION

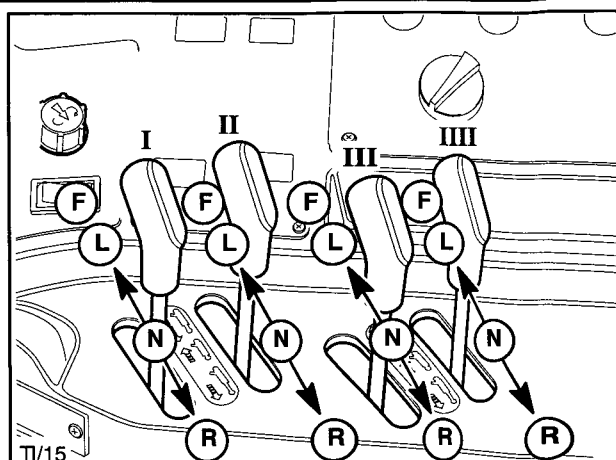
The valves are operated by levers which are located in the console to the right of the operator's seat.

The levers and their respective valves are color coded for identification, as follows:

Lever Color	Valve Position/No.
Green	Right-hand outer - I
Blue	Right-hand inner - II
Ginger	Left-hand inner - III
Black	Left-hand outer - IIII

Each remote control valve lever has four operating positions, as follows:

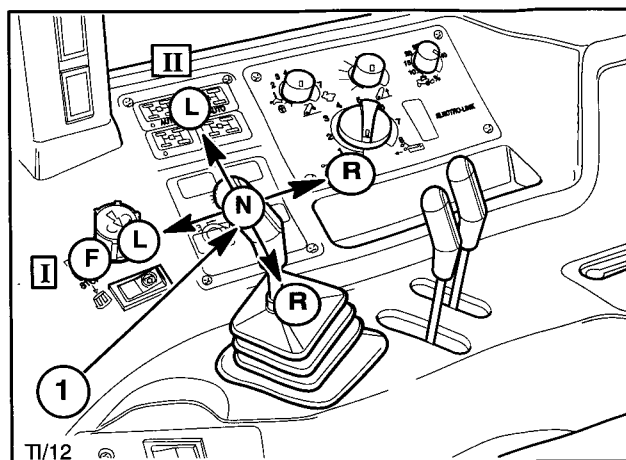
1. Raise (R) – Pull a lever toward you to extend the cylinder to which it is connected and raise the implement.
2. Neutral (N) – Push the lever away from you from the raise position to select neutral and de-activate the connected cylinder.
3. Lower (L) – Push the lever further away from you, past neutral, to retract the cylinder and lower the implement.
4. Float (F) – Push the lever fully away from you, beyond the 'lower' position, to select 'float'. This will permit the cylinder to extend or retract freely, thereby allowing equipment such as scraper blades to 'float' or follow the ground contour.



2-168

An alternative joystick control (1), may be installed in place of the levers operating remote control valves I and II. The joystick operates in a cross pattern. As with the conventional levers, the joystick provides four positions: Raise (R), Neutral (N), Lower (L) and Float (F).

When the joystick is moved rearward, it will raise an implement connected to valve No. I in the same way as a conventional lever. When moved forward, it will lower an implement connected to valve No. I. Fully forward, beyond the 'lower' position, is the float position.



2-169

OPERATION

When the joystick (1) is moved to the left it will raise an implement connected to valve No. II. When moved to the right it will lower an implement connected to valve No. II.

The joystick has the added advantage of being able to operate two remote control valves simultaneously by moving the lever between the valve No. I and No. II positions. This feature will be found useful when operating, loaders, fertilizer spreaders, etc.

NOTE: The float position is also used for retracting a single-acting ram cylinder, such as when lowering a trailer, etc. (see Operating Single-Acting Cylinders).

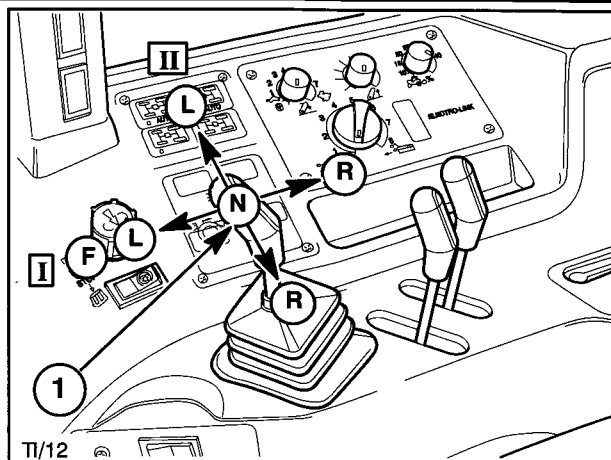
The extend, neutral, retract and float positions are identified by symbols on a decal adjacent to the control levers.

A detent will hold the lever in the selected extend or retract position until the remote cylinder reaches the end of the stroke when the control lever will automatically return to neutral. The lever may be returned to neutral manually. The lever will not return automatically from the float position. The detent screw (3), may be adjusted to vary the system pressure required to return the lever automatically to the neutral position.

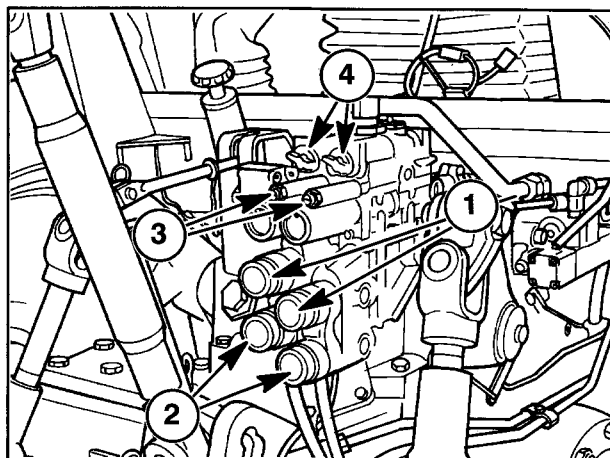
NOTE: For applications where detents are not required or hinder smooth operation, they can be removed. See your authorized dealer for additional information.

Each remote control valve has its own flow control valve (4), which permits individual flow control when operating two or more valves simultaneously. Each remote control valve is provided with a pair of couplers (1) and (2). The couplers are a self-sealing/locking design but will allow remote cylinder hoses to pull free if the implement should become disconnected from the tractor.

The upper (lift) coupler (1), is identified by an 'extended cylinder' symbol moulded into the rubber dust cap. The lower (drop) coupler (2) has a 'retracted cylinder' symbol.



2-170



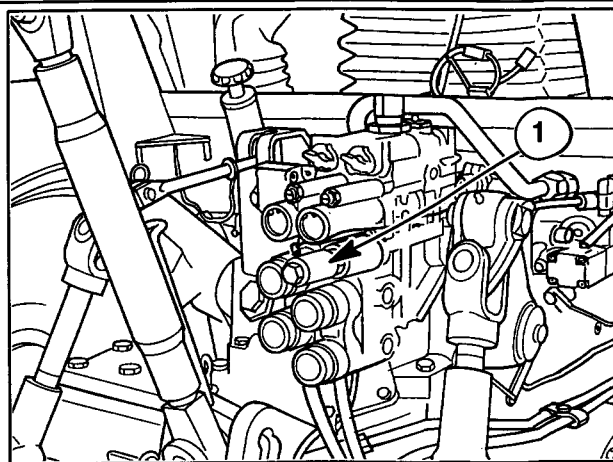
2-171

NOTE: Do not hold the remote lever in the extend or retract position once the remote cylinder has reached the end of the stroke as this will cause the system to operate at maximum pressure. Over an extended period, this could overheat the oil and may lead to failure of hydraulic and driveline components.

Remote Valve Load Check (if equipped)

No. I and No. III remote valves can be equipped with a positive electric hydraulic load check (1) to prevent settling of heavy implements.

The load check is located on the extend circuit of valve No. I or No. III.

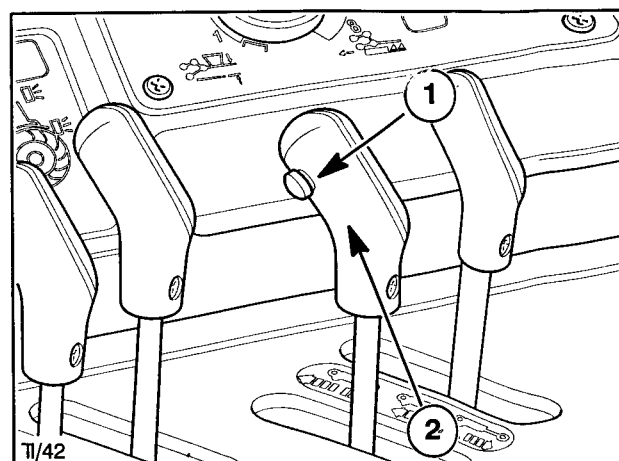


2-172

If the load check is installed, remote levers No. I and No. III (2), will have a push button (1), that must be held in to allow oil flow. Activate the remote as previously described.

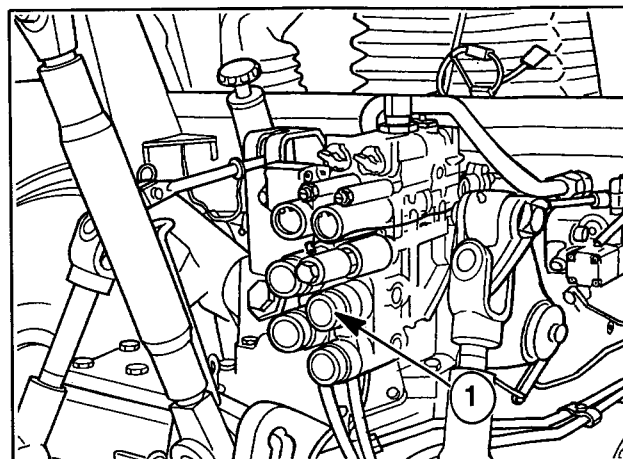
NOTE: The float function will only work with the push button held in.

IMPORTANT: Always use implement transport locks when moving equipment on roadways. Don't rely on hydraulic lock mechanisms.




2-173

When using the load check, make sure that the heavy work circuit is connected to the No. I lift port (1).



2-174

Connecting Remote Cylinders

 **WARNING:** Before connecting or disconnecting hydraulic hoses, stop the engine and relieve the pressure in the circuit by moving the remote control valve lever(s) fully forward to the 'float' position then back to neutral. On tractors equipped with load checks on remote valves No. I or No. III, hold the button in while selecting 'float'. Never work under or allow anyone near raised equipment as it will drop when relieving pressure in the system. Before disconnecting cylinders or equipment ensure the equipment or implement is securely supported.

NOTE: Before connecting remote cylinders, stop the engine and thoroughly clean the connections to prevent oil contamination. Remote cylinders are operated by oil drawn from the tractor hydraulic system, therefore, always check and replenish the hydraulic system oil after remote cylinder equipment has been connected and cycled a few times. Operating the tractor with a low oil level may result in damage to the rear axle and transmission components.


NOTE: When refilling the rear axle to accommodate the requirement of remote cylinders, no more than

11.5 Gallons (45 litres) should be added to bring the oil level up to the full mark on the dipstick. Alternatively, remote cylinders with a total oil capacity of up to 4.6 Gallons (18 litres) may be connected to the tractor hydraulic system without adding oil, provided that the tractor is being operated on level ground.

To connect a remote cylinder, insert the feed and/or return hose through the slit in the appropriate dust cap, ensuring it is correctly seated in the coupler. Ensure that there is sufficient slack in the hose(s) to allow the tractor/implement to turn in either direction.

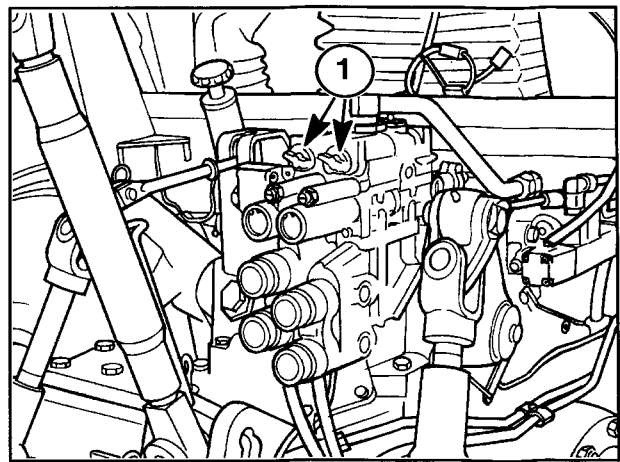
To equalize the pressure in the hose and tractor couplers, start the engine and move the valve control lever to the 'float' position, then return it to neutral.

To disconnect, grip the hose a short distance from the coupler, push the hose forward, into the coupler, then quickly pull on the hose to 'pop' the coupler free.

 **WARNING:** Never work under equipment supported by a hydraulic device because it may drop if the control is actuated (even with the engine stopped) or in the event of hose failure, etc. Always use a secure support for equipment which must be serviced while in the raised position.

The flow control valve (1), meters the flow of oil to the remote cylinder and thus controls the rate of response of the cylinder.

Turn the flow control knob counterclockwise (hare symbol) to increase the rate of oil flow. Turn the knob clockwise (tortoise symbol) to decrease the rate of flow. For flow rates, see Section 5 – Specifications.



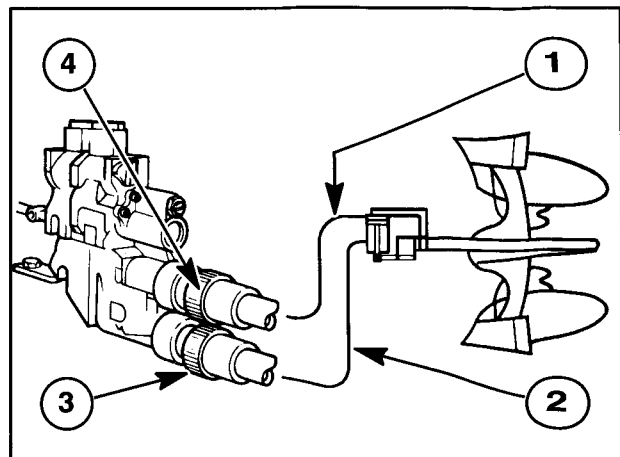
2-175

Operating Double-Acting Cylinders

Connect the **feed** hose (1) between the **piston end** of a double-acting cylinder and the **upper** coupler (4) on the remote control valve. Connect the **return** hose (2) between the **lower** coupler (3) on the same valve and the **rod end** of the cylinder. To extend a double-acting cylinder, pull the control lever towards you, to the 'raise' position.

To retract a double-acting cylinder, push the control lever away from you, past neutral to the 'lower' position.

Further movement of the lever away from you will select 'float' which will allow the cylinder to extend or retract freely. This feature is use full when working with equipment such as scraper blades and loaders.



2-176

Operating Single-Acting Cylinders

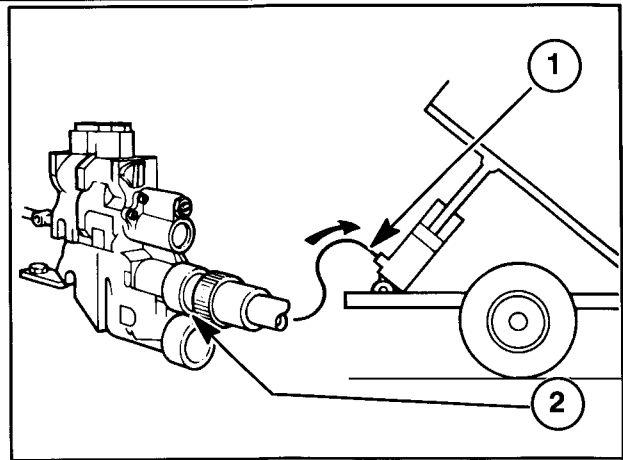
Connect the hose (1) from a single-acting cylinder to the **upper** coupler (2) on the remote control valve, as previously described.

To extend a single-acting cylinder, pull the control lever toward you, to the 'raise' position.

Manually return the lever to the neutral position to stop the cylinder before it is fully extended or allow the valve to return to the neutral automatically when the cylinder reaches the end of it's stroke.

To retract a single-acting cylinder, move the lever fully away from you, to the 'float' position.

IMPORTANT: Always use the 'float' position to lower a single-acting cylinder. The 'lower' position is for double-acting cylinders only.



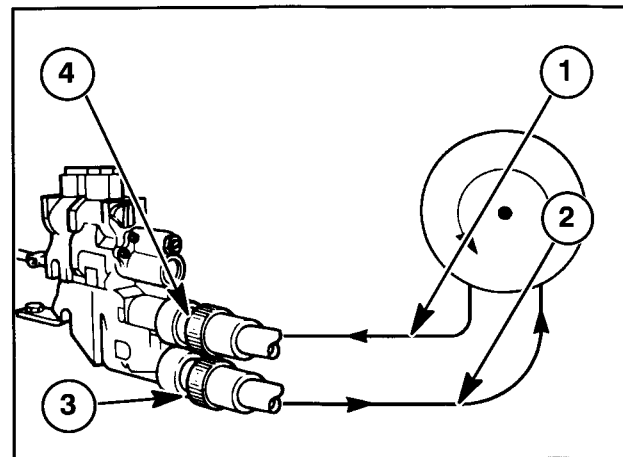
2-177

Operating Continuous Flow Hydraulic Equipment

Continuous flow hydraulic equipment (e.g. hydraulic motors) should be connected to remote control valve coupler with the **feed** hose (2) connected to the **lower** coupler (3) and the **return** hose (1) connected to the **upper** coupler (4) of the same valve.

With the remote control valve lever fully away from you, in the 'float' position the motor will be stationary. The hydraulic motor will operate if the lever is pulled towards you, to the 'lower' position.

IMPORTANT: To stop the motor, move the lever fully away from you, to the 'float' position. The motor will then slow and not stop abruptly causing internal line pressures which, unless relieved by special valving, could damage the motor seals.



2-178

Observe the following to further protect the tractor and equipment:

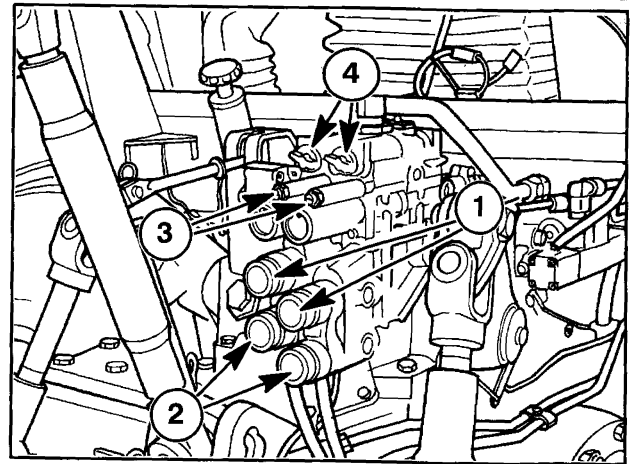
- Do not open any by-pass valve in the equipment or motor. Use the flow control valve (4) to control the rate of flow or speed of the motor.
- Do not hold the remote control valve lever to operate the equipment. If the detent will not hold the lever, adjust the detent screw (3), as previously described, check the equipment for proper adjustment or contact your dealer for assistance in adapting the equipment to suit the tractor.
- To assure optimum hydraulic oil cooling and prevent overheating, operate continuous flow equipment at the highest flow setting (by use of the flow control valve) and lowest engine speed that will give the required machine performance and speed.
- It is recommended that a temperature gauge, where available, is installed in the remote circuit when using hydraulic motors for continuous operation. If over-heating occurs, stop the hydraulic motor until the oil cools. Ensure the flow control setting is at maximum and the engine speed at a minimum, appropriate to machine performance.

If operating conditions are normal and high temperatures persist, install an oil cooler in the motor return circuit (2). The maximum recommended operating temperature of the oil is 230°F (110°C).

Your dealer can supply a suitable oil cooler and the necessary fittings or make the installation for you.

Operating Several Remote Valves Simultaneously or Remote Valves and Hydraulic Lift Simultaneously

NOTE: *The variable displacement pump with closed center load-sensing adjusts the oil flow according to the individual flow control settings up to the maximum output possible, dependent upon engine speed. The oil flow will be relatively constant in the remote control valve circuits if the flow control valves are used to regulate the flow, thus providing constant operating speed for hydraulic motors, etc., even if*



2-179

engine speed varies. Maintain the engine speed above the minimum required for simultaneous operation of all the required circuits and vary ground speed by selection of the appropriate gear ratio.

If operating two or more remote control valves simultaneously or remote valves and the hydraulic lift, all the flow control valves should be adjusted to provide a partial flow. If not, all the available flow may be directed to the full flow circuit when the pressure in that circuit is less than that of the other circuits in use.

Bleeding Remote Cylinders

When connecting a cylinder with trapped air, i.e., a new cylinder, one that has been out of service or one that has had the hoses disconnected, it will be necessary to bleed the cylinder to remove the air.

With the hoses connected to the remote control valve couplers at the rear of the tractor, position the cylinder with the hose end uppermost and extend and retract the cylinder seven or eight times using the remote control valve lever.

Check the rear axle oil level before and after operating a remote cylinder.

THREE-POINT LINKAGE

NOTE: Before attaching equipment read this section carefully.

ATTACHING 3-POINT EQUIPMENT

NOTE: Before attaching equipment, adjust lift rods and select the correct top link hole for the implement and work to be carried out.

Ensure that the sway blocks are installed and correctly adjusted. Remove the swinging drawbar, if close-mounted equipment is being attached.

IMPORTANT: Always select Position Control when attaching equipment, transporting equipment, when no equipment is attached or at any time when not operating in Draft Control.

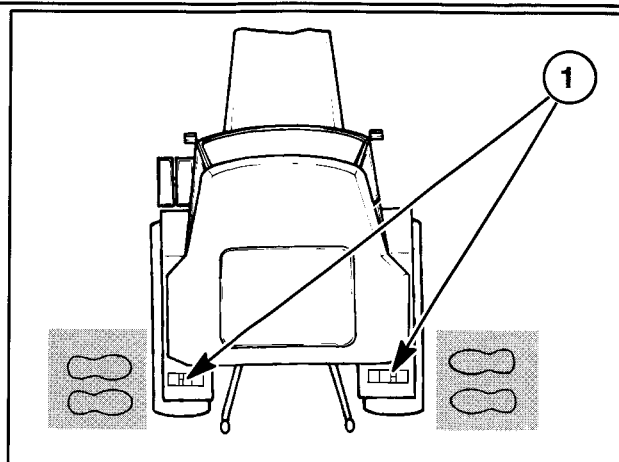
NOTE: See also 'External 3-Point Hitch Controls' (1) earlier in this section for more details.

Most equipment can be attached to your tractor as follows:

1. Position the tractor so that the lower link hitch points are level with and slightly ahead of the implement hitch pins.
2. Attach the implement to the lower links, as described in 'Flexible Link Ends' later in this section.

IMPORTANT: Before transporting or operating equipment, ensure that the flexible link ends are locked in the operating position.

3. With the engine stopped and parking brake engaged, adjust the top link until the implement mast pin can be inserted through the mast and top link. Adjust the top link to the initial 28.5 in. (724 mm) setting.
4. Connect remote equipment, where applicable.
5. After attaching implement and before actual operation check that:
 - No interference occurs with tractor components.
 - The top link does not contact the PTO guard with the implement at its lowest position.



2-180

WARNING: Engage the parking brake before leaving the tractor to make the connections. It is essential to have the engine running to operate the external fender-mounted switches when making lower link connections.

IMPORTANT: Before operating PTO driven equipment, check to make sure that the PTO driveline will not over-extend and become disengaged, bottom out or be at an excessive angle. Ensure that the driveline shield does not contact the PTO guard or drawbar. See 'Attaching P.T.O.-Driven Equipment' earlier in this section

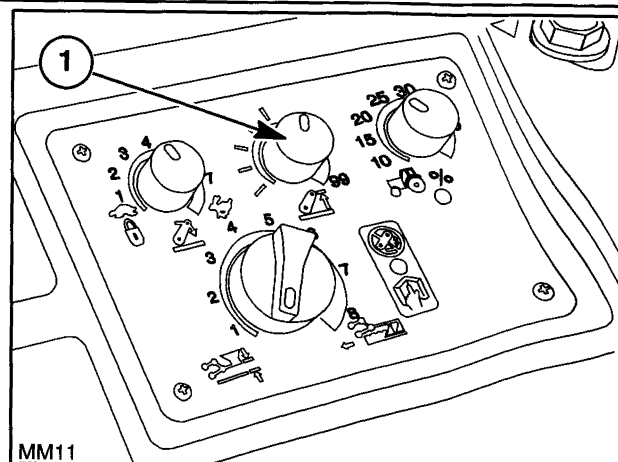
IMPORTANT: When attaching mounted or semi-mounted equipment to the 3-point linkage or when attaching trailed equipment to the drawbar or hitch, ensure that there is adequate clearance between the implement and the tractor. Semi-mounted or trailed equipment may interfere with the tractor rear tires. If necessary, adjust steering stops (front wheel drive only), and sway blocks.

IMPLEMENT TO CAB/ROPS CLEARANCE

WARNING: *Some mounted and semi-mounted equipment may interfere with and damage the cab or ROPS. You may be injured by broken glass or the cab ROPS may be damaged if equipment interferes with the cab or ROPS.*

To prevent cab/ROPS damage, proceed as follows:

- Attach the equipment as outlined previously.
- Check for adequate clearance by slowly raising the equipment with the lift control lever in Position Control. If any part of the equipment comes closer than 4 in. (100 mm) to the cab or ROPS, adjust the 3-point hitch height limit control knob (1) to limit upward movement.

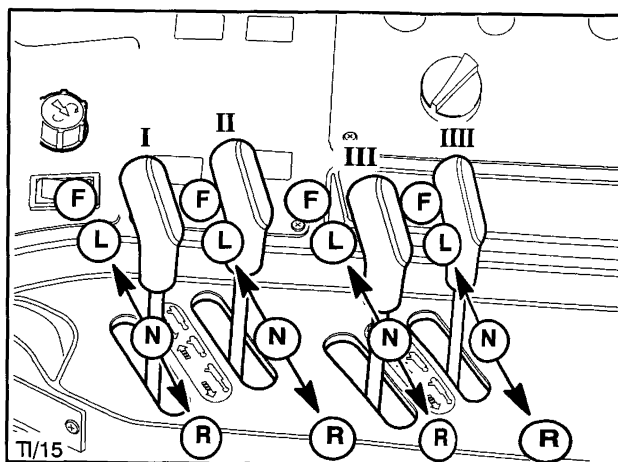


2-181

REMOVING 3-POINT EQUIPMENT

When removing equipment, the procedure is the reverse of attaching. The following information will make disconnection easier and safer.

- Always park the equipment on a firm, level surface.
- Engage the parking brake.
- Support equipment so that it will not tip or fall when detached from the tractor.
- Always relieve all hydraulic pressure in remote cylinders by selecting the float "F" position before disconnecting.



2-182

3-POINT LINKAGE ADJUSTMENT

When attaching mounted equipment to the three-point linkage, the following adjustments may be made to ensure satisfactory operation:

LIFT RODS, LOWER LINKS AND TOP LINK

WARNING: Before disconnecting a lift rod from the lower link, lower attached equipment to the ground and stop the engine. Before removing the securing pin, ensure that attached equipment is correctly supported and that no residual pressure remains in the hydraulic system. When adjusting lift rods, ensure that at least 1.6 in. (40 mm) of thread remains engaged in the lower end of the lift rod assembly.

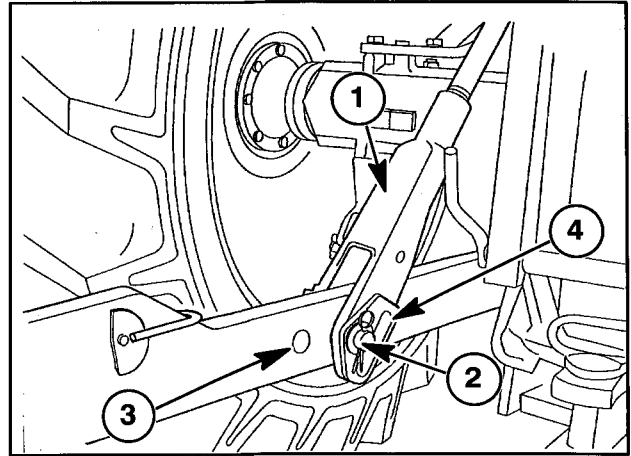
Lower Links and Left-hand Lift Rod

Each lower link has two holes for attachment of the lift rods. Attach the lift rods to the front hole (nearest the tractor – as shown) for maximum lift height. Use the rear hole (3) for maximum lift capacity.

NOTE: Both left and right-hand lift rods have a slot (4) as well as a round hole at the lower end. If the securing pin (2), is inserted through the slotted hole this will allow an implement limited vertical movement independent of the tractor to facilitate the operation of wide implements.

To adjust the left-hand lift rod on 8160 and 8260 model tractors, remove the split pin and locating pin (2), turn the lower end of the lift rod (1) to lengthen or shorten the lift rod assembly, as required. Replace the locating pin and secure with a new split pin.

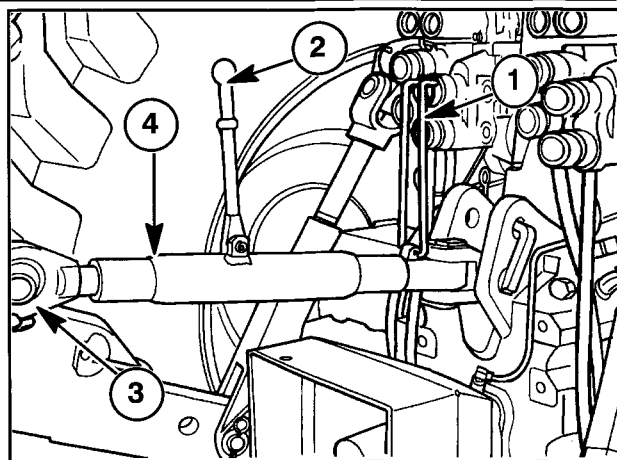
NOTE: See “Right-Hand Lift Rod” for 8360 and 8560 models.



2-183

Top Link

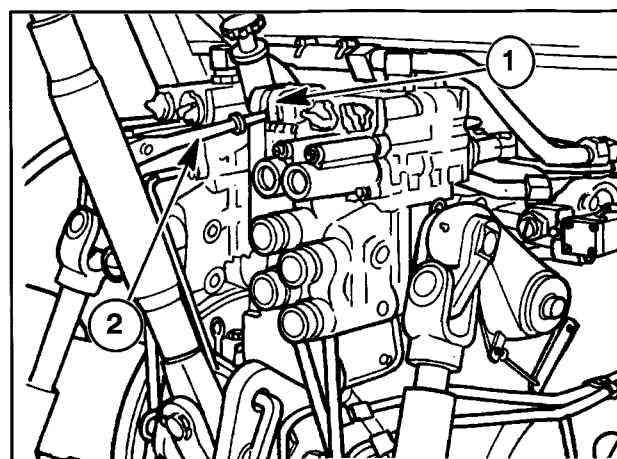
Turn the link end (3) to lengthen or shorten the top link. Rotation of the sleeve (4) will provide further adjustment. Pull the locking latch (1), away from the sleeve to allow the sleeve to turn. To prevent further rotation of the sleeve after adjustment, push the latch back to engage the transport hanger (2).



2-184

When not in use, the top link can be removed and stored or left in an upright position and retained by hooking the ball end of the transport hanger (2), into the bracket (1) on the remote control valve housing.

Most equipment will operate at the proper height when the link is adjusted to 28.5 in. (724 mm) measured between the centers of the attaching points. Re-adjust to level the equipment, as required.



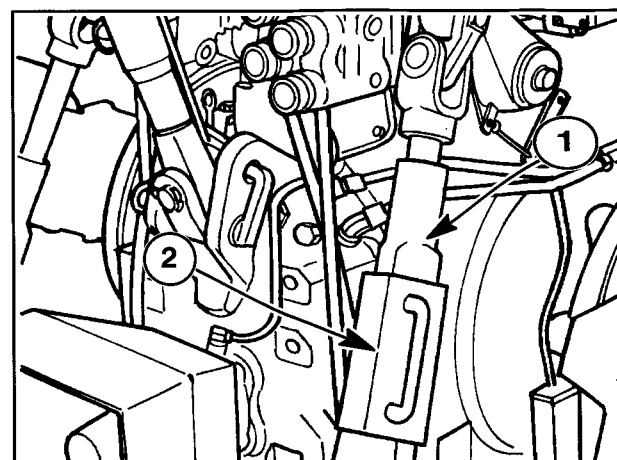
2-185

Right-hand Lift Rod

The right-hand lift rod is adjusted by a turnbuckle (1) on the lift rod.

The lift rod is adjusted by rotating the upper part of the lift rod by means of the handle (2) on the turnbuckle.

NOTE: A similar turnbuckle adjuster is installed on the left-hand lift rod on 8360 and 8560 tractors.

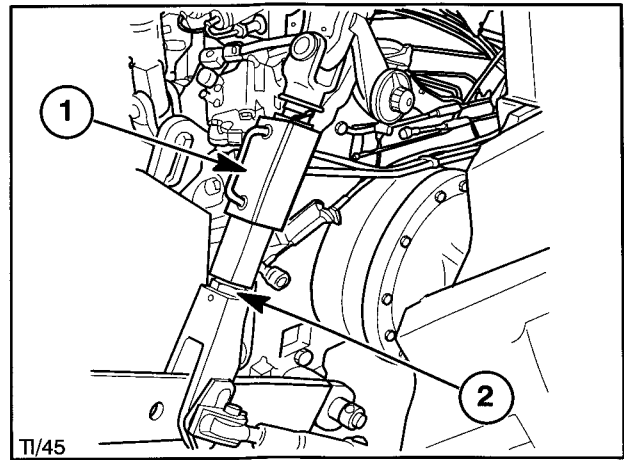


2-186

Before the turnbuckle can be rotated, it is necessary to lift the turnbuckle (1), to disengage it from the hexagon (2) on the lower section of the lift rod. Rotate the turnbuckle to lengthen or shorten the lift rod assembly.

When adjustment is satisfactory, allow the turnbuckle to lower into position. Ensure that the turnbuckle is fully down and engages with the hexagon to prevent unintentional rotation.

IMPORTANT: When attaching mounted or semi-mounted equipment to the 3-point linkage or when coupling trailed equipment to the drawbar, ensure that there is adequate clearance between the implement and the ROPS, cab or rear window in any open position.



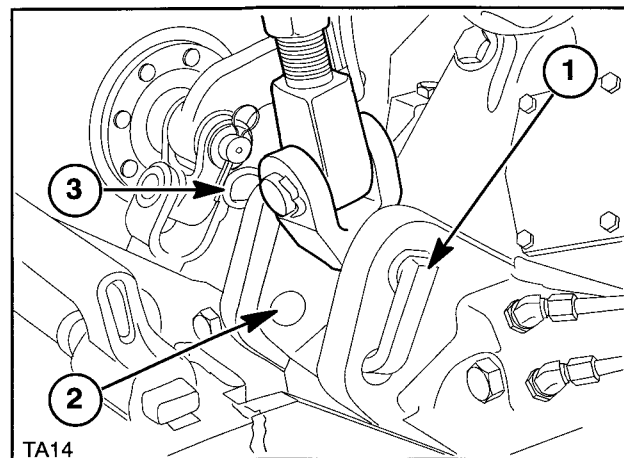
2-187

TOPLINKCONNECTIONBRACKET (all models)

Two holes are provided in the bracket for attachment of the top link.

Insert the pin (1) through the upper hole, as shown, for maximum lift capacity and the greatest implement to cab clearance. Use the lower hole (2) for the best ground penetration and greatest implement to ground clearance (when the implement is raised).

To relocate the top link, pull out the 'R' clip (3) and extract the securing pin. Relocate the top link and pin, as required, ensuring that the tang on the end of the securing pin handle locates in the other hole.

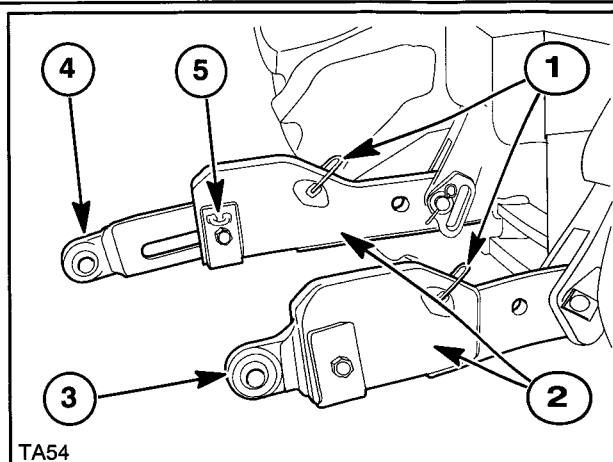


2-188

FLEXIBLE LINK ENDS

A release ring (1) is provided on the upper surface of each lower link (2). Pull the rings (1) up to release the link ends. With the link ends released, connection to the implement will be easier. The link end (4) is shown in the extended position. The link end (3) is shown in the closed (operating) position.

With both link ends extended, connect the link ends to the equipment and secure with lynch pins. Start the engine and carefully inch the tractor rearwards until both flexible link ends lock in the operating (closed) position (3). Stop the engine and engage the parking brake.



2-189

IMPORTANT: Before transporting or operating the equipment, make sure the flexible link ends are locked in the operating position. Remove the draw-bar if it interferes with close-mounted equipment.

To change from ASAE category II to category III hitch, new link ends (4) are required.

Remove securing bolt (5) and spacer. Replace the link ends and reinstall the spacer, bolt and nut.

Model 8560 tractors are provided with both sets of link ends. Category III ends for other models are available from your authorized dealer.

SWAY BLOCK STABILIZERS

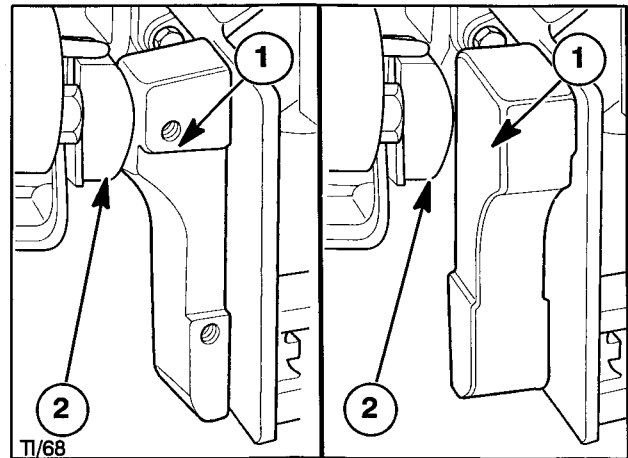
Sway block stabilizers are installed on all tractors.

WARNING: *Never operate steerable equipment unless the sway block stabilizers are installed and correctly adjusted to prevent excessive lateral movement.*

Sway block stabilizers will control the sway of the lower links and attached equipment when in work or when being transported. This is especially important when operating on slopes or near fences, walls or ditches and with certain implements. Check your Implement Operator's Manual.

Sway block stabilizers consist of reversible blocks (1), bolted to either side of the drawbar hanger. A steel wear pad (2), bolted to the inner surface of each lower link, contacts the sway block to prevent excessive sway (lateral movement) of the lower links. The thickness of the pad (and therefore the degree of sway) is controlled by two spacer shims of 8 mm and 10 mm thickness, respectively.

The positioning of the shims relative to the pad depends upon the required width setting of the lower links (to suit the attached implement) or the degree of sway required.



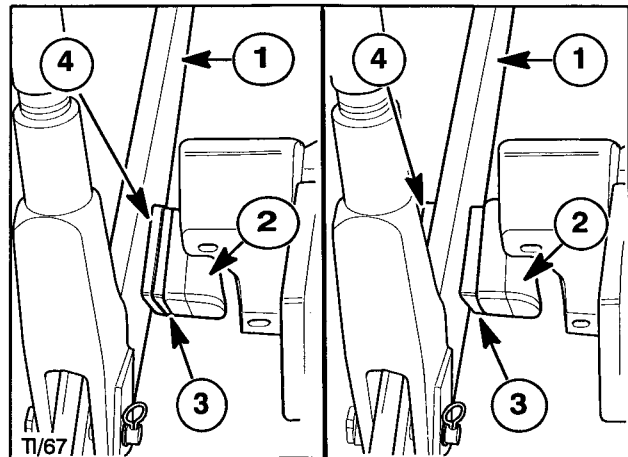
2-190

Shim/Wear Pad Position

The left-hand side shows both spacer shims (3) and (4) installed between the wear pad (2) and the lower link (1). This will increase the distance between the lower links to suit a wider implement such as ASAE category III.

The right-hand side shows the 8 mm shim (4) on the outer surface of the lower link with the 10 mm shim (3) installed between the pad and the lower link for category II or IIIN applications.

The shims may be omitted altogether to reduce the distance between the lower links when operating with a narrower implement.

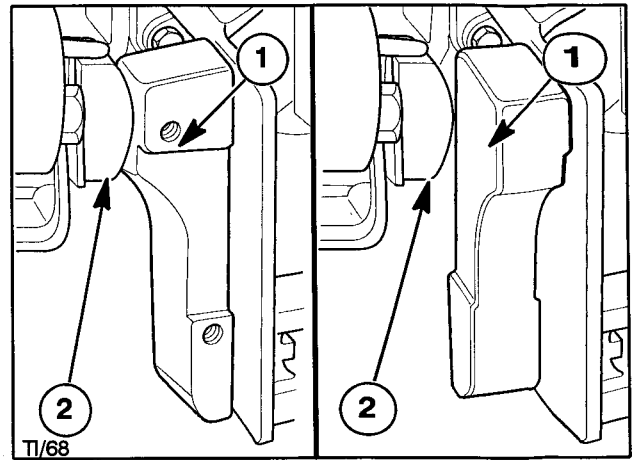


2-191

Sway Block Position

To allow lateral movement of the lower links (and attached equipment) in both the operating and transport positions, attach both sway blocks (1) so that the flat surface faces the wear pad (2) as shown in the right-hand side.

When it is desirable to have sideways movement of the equipment in the operating position, but remain rigid in the transport position, remove the bolts securing the sway blocks to the drawbar hanger and relocate the sway blocks (1) so that the curved surface faces the wear pad (2) as shown in the left-hand side.

**2-192**

This will allow the implement to sway when the lower links are lowered into the working position but become rigid when raised.

IMPORTANT: When setting the sway blocks to provide lateral movement, ensure that there is no possibility of the lower links or implement contacting the rear tires. Ensure that there is sufficient clearance between the wear pads and the sway blocks to allow the 3-point linkage to raise and lower without the possibility of the lower links binding or becoming bent.

DRAWBAR AND TOWING ATTACHMENTS

ATTACHING/DETACHING TRAILED EQUIPMENT

IMPORTANT: *Regulations in some areas require brakes on towed equipment when operating on the public highway. Before travelling on public roads, make sure you comply with legal requirements for your area.*

To attach the tractor to trailed equipment and implements:

1. Ensure that the implement is at draw bar height.
2. Slowly inch rearwards to allow the drawbar and implement hitch to align.
3. Apply the parking brake and stop the engine.
4. Insert the hitch pin and ensure that the retainer is in the latched position.

IMPORTANT: *When attaching mounted or semi-mounted equipment to the 3-point linkage or when attaching trailed equipment to the drawbar or hitch, ensure that there is adequate clearance between the implement and the tractor. Semi-mounted or trailed equipment may interfere with the tractor rear tires. If necessary, adjust sway blocks or drawbar.*

NOTE: *For implements that require hitch extensions or interfere with the tractor clevis, remove and store the clevis and hitch pin.*

Always use a safety chain installed between the tractor and implement hitch when transporting equipment on the highway. See information later in this section.

Observe the following precautions for towing equipment not equipped with brakes:

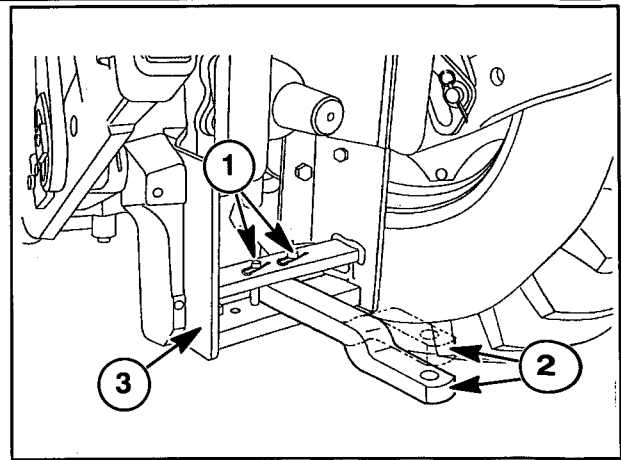
- Do not tow equipment weighing more than twice the tractor weight.
- Do not exceed 10 MPH (16 km/h) if towed equipment weighs more than the tractor.
- Do not exceed 20 MPH (32 km/h) while towing equipment that weighs less than the tractor.

SWINGING DRAWBARS

Two types of swinging drawbar are available. The sliding type is illustrated. The roller type, shown in Figure 2-195, is recommended when heavy draft, trailed equipment is used for extended periods. This drawbar is mounted on rollers and offers additional turning ease when compared with the sliding type.

Sliding Type Swinging Drawbar

The drawbar (2) pivots at a single pin at the front end to allow the rear of the drawbar to swing the full width of the hanger (3). By inserting the swing limiter pins (1) in the appropriate holes, restricted movement of the drawbar is permitted. The drawbar can be pinned in any one of five positions by insertion of the pins in the appropriate holes. The drawbar is shown pinned in the central position to prevent swinging.

**2-193**

Pin the drawbar to prevent swinging when pulling equipment which requires accurate positioning and when transporting equipment.

Allow the drawbar to swing when pulling ground engaging equipment which does not require accurate positioning. This will make steering and turning easier.



WARNING: Always secure the drawbar to prevent swinging when transporting equipment or when operating any but ground engaging equipment.

The drawbar is adjustable for height and length relative to the end of the P.T.O. shaft. To vary the height of the drawbar to implement hitch point, remove the drawbar (2) and invert it.

OPERATION

The front securing pin may be inserted in one of three holes in the drawbar to vary the P.T.O. shaft to hitch point distance. See figure and the following table:

Drawbar Hole	P.T.O. Shaft to Drawbar Hitch Point	Maximum Static Downward Load
1	16 in. (406 mm)	2000 lb. (910 kg)
2	14 in. (356 mm)	2350 lb. (1065 kg)
3	9.6 in. (243 mm)	3600 lb. (1630 kg)

Use of hole 1 is required for 1000 rev/min P.T.O. operations and hole 2 for 540 rev/min P.T.O. operations.

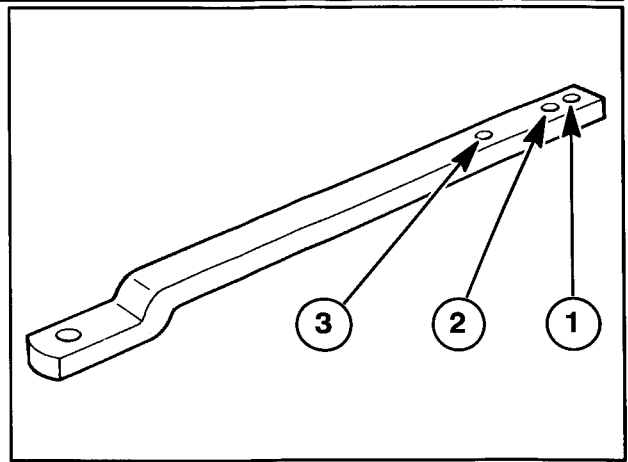
When towing equipment exerting high static downward forces, such as two-wheeled trailers, etc., use the close-coupled position – hole 3.



WARNING: Do not pull from the lower links with the links above the horizontal position. Always use the drawbar, or lower links in the lowered position for pull-type work, otherwise the tractor may overturn rearwards.

NOTE: When supporting equipment on the drawbar ensure that the total weight on the rear axle does not exceed the maximum static downward load or the rear tire load capacity, whichever is the lower (see Tire Pressures and Permissible Loads at the end of this section).

IMPORTANT: When transporting equipment on the highway it is recommended that a safety chain having a tensile strength equal to the gross weight of the implement be installed between the tractor and implement hitch. See Safety Chain later in this section.



2-194

Roller Type Swinging Drawbar

The drawbar (2) pivots at a single pin at the front end to allow the rear of the drawbar to swing the full width of the hanger. By inserting the swing limiter pin (1) in the appropriate hole and through the drawbar, the drawbar can be pinned in any one of seven positions. The drawbar may be allowed to swing the full width of the hanger (3).

Pin the drawbar to prevent swinging when pulling equipment which requires accurate positioning and when transporting equipment. Allow the drawbar to swing when pulling ground engaging equipment which does not require accurate positioning. This will make steering and turning easier.

WARNING: Always secure the drawbar to prevent swinging when transporting equipment or when operating any but ground engaging equipment.

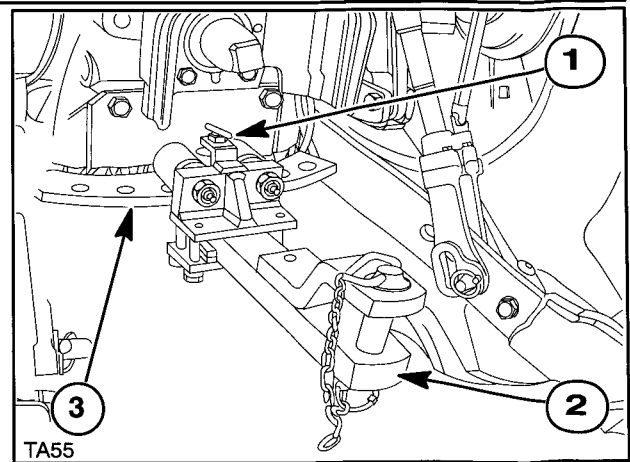
The drawbar is adjustable for height and length relative to the end of the P.T.O. shaft. To vary the height of the drawbar/implement hitch point, remove the drawbar (2) and invert it.

The front securing pin may be inserted in one of two holes in the drawbar to vary the P.T.O. shaft to hitch point distance. See figure and the following table:

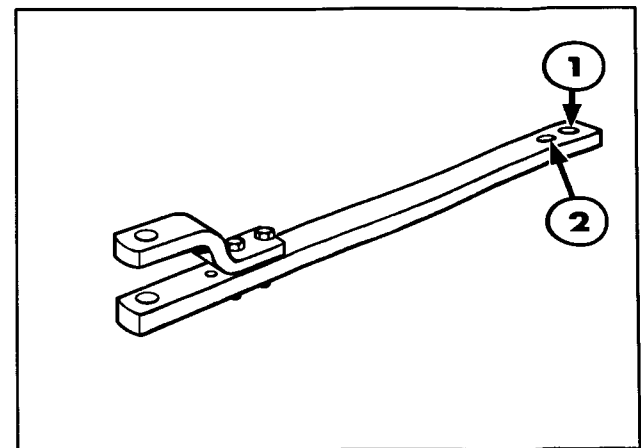
Hole	P.T.O. Shaft to Drawbar Hitch Point	Maximum Static Downward Load
Drawbar clevis		
1	16 in. (406 mm)	3000 lb. (1360 kg)
2	14 in. (356 mm)	3600 lb. (1630 kg)
Drawbar clevis down		
1	16 in. (406 mm)	2500 lb. (1135 kg)
2	14 in. (356 mm)	2500 lb. (1135 kg)

Use of hole (1) is required for 1000 rev/min P.T.O. operations and hole (2) for 540 rev/min P.T.O. operations.

When towing equipment exerting high static downward forces, such as two-wheeled trailers, etc., use hole (2).



2-195



2-196



WARNING: Do not pull from the lower links with the links above the horizontal position.

Always use the **drawbar** or lower links in the lowered position for pull-type work, otherwise the tractor may overturn rearwards.

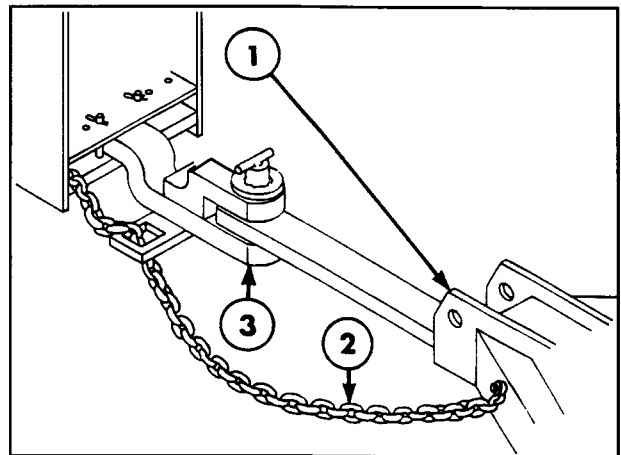
NOTE: When supporting equipment on the drawbar ensure that the **total weight** on the rear axle does not exceed the **maximum static downward load** or the **rear tire load capacity**, whichever is the lower (see Tire Pressures and Permissible Loads at the end of this section).

IMPORTANT: When transporting equipment on the highway it is **recommended** that a safety chain having a tensile strength equal to the gross weight of the implement be installed between the tractor and implement hitch.

SAFETY CHAIN

When towing implements (1) on public roads, use a safety chain (2) with a tensile strength equal to or greater than the gross weight of the implement to be towed. This will control the implement in the event the drawbar (3) and implement become disconnected.

After attaching the safety chain, make a trial run by driving the tractor to the right and to the left for a short distance to check the safety chain adjustment. If necessary, re-adjust to eliminate a tight or loose chain.



2-197

Check the implement operator's manual for implement weight and attaching hardware specifications.

Safety chains, attaching hardware and chain guide are available from your authorized dealer.

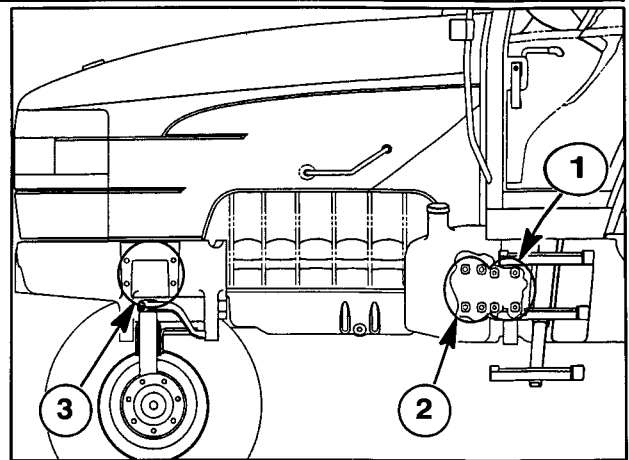
EQUIPMENT MOUNTING POINTS

The tractor is provided with a number of threaded holes for the purpose of attaching optional equipment. The mounting points on the left-hand side of the tractor are shown. There are matching threaded holes on the right-hand side.

The size of the holes shown are as follows:

- (1) Four holes M14 x 1.5 – 36 mm deep
- (2) Four holes M20 x 2.5 – 36 mm deep
- (3) Four holes M20 x 2.5 – 48 mm deep.

NOTE: Holes (1) have already been utilised on your tractor to attach the cab or ROPS.

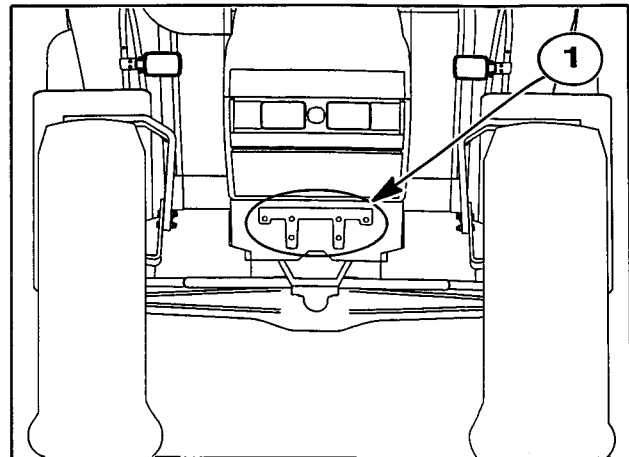


2-198

The size of the holes shown are as follows:

- (1) Six holes M20 x 2.5 – 46 mm deep.

NOTE: If front end weights are on the tractor then holes (1) will have already been utilised for the weight carrier.

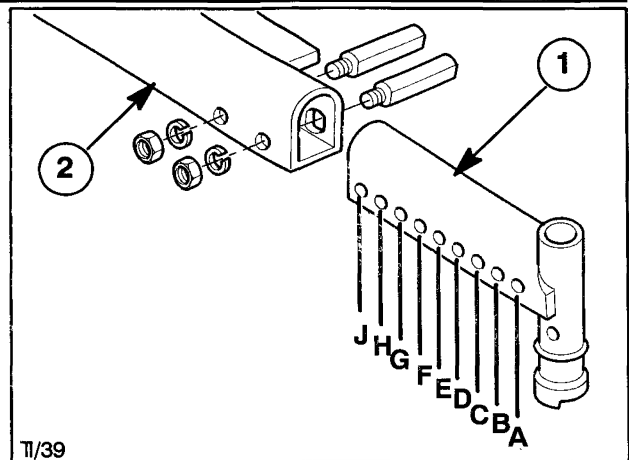


2-199

FRONT WHEEL TRACK ADJUSTMENT (two wheel drive)

The front axle consists of a hollow center beam with a telescopic section at each end. A number of holes at 2 in. (50 mm) intervals are provided in the telescopic sections for adjustment purposes. Adjustment of the front wheel track width is effected by extending **both** ends of the axle **equally**.

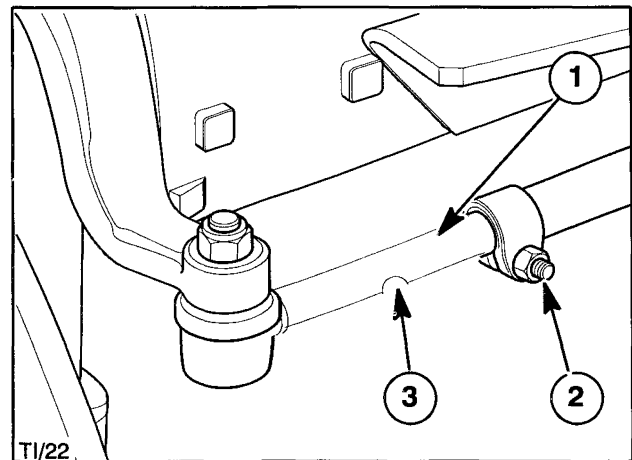
To extend the axle, apply the handbrake and block the rear wheels. Jack up the front axle and place on axle stands. Remove the nuts, bolts and washers securing the left-hand telescopic section (1), to the center beam (2). Repeat on the right-hand side of the axle.



2-200

The power steering cylinder and track control rod, located behind the axle, must be disengaged to permit adjustment of the axle. The track control rod is adjustable and consists of a central, hollow tube with a threaded ball joint at each end (1), Figure 2-202.

The left-hand end (1) has a number of notches (3) at 2 in. (50 mm) intervals and a locating bolt passing through the clamp and one of the notches in the solid section locks the track rod assembly at the desired length. Additionally, both ends of the track rod are threaded to provide fine adjustment.

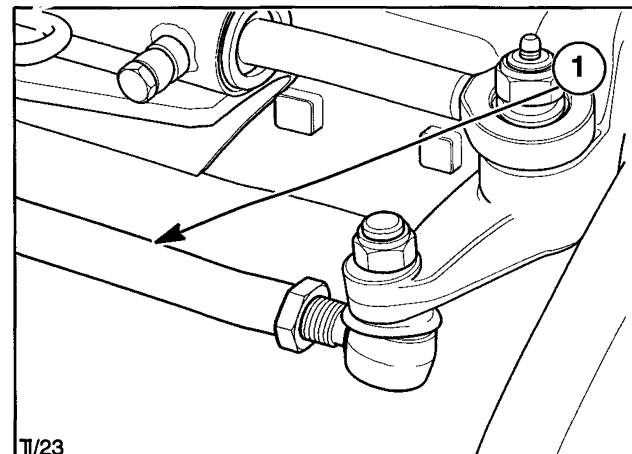


2-201

Remove the locating bolt (2) Figure 2-201 from the left-hand end of the track rod. This will permit the track rod to extend or retract freely.



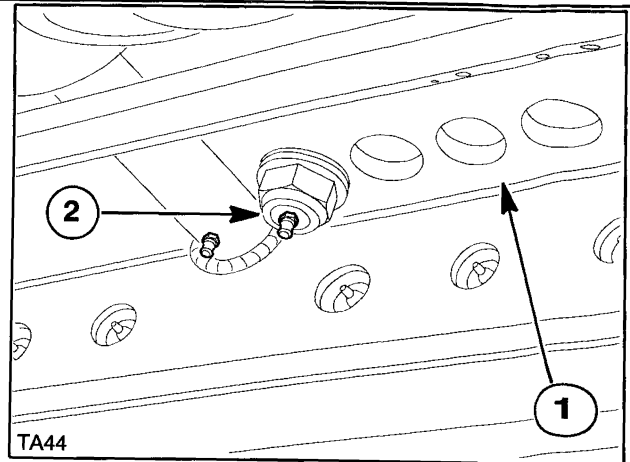
WARNING: Your tractor is produced with lights that meet lighting regulations when operating or traveling on the public highway. If the wheel track setting is adjusted beyond the initial factory position then you may be required to reposition the lights or fit auxiliary lighting to comply with legal requirements. Before travelling on the highway, ensure that the overall tractor width does not exceed the maximum permitted in your location.



2-202

OPERATION

The power steering cylinder is attached to the axle center beam by a pivot pin (2), passing through one of nine holes drilled in the support bracket (1). When the right-hand end of the axle is moved, the power steering cylinder must be moved by the same number of holes. For example, if the right-hand end of the axle is moved 3 holes to the right then the steering cylinder must also be moved to the right by 3 holes.

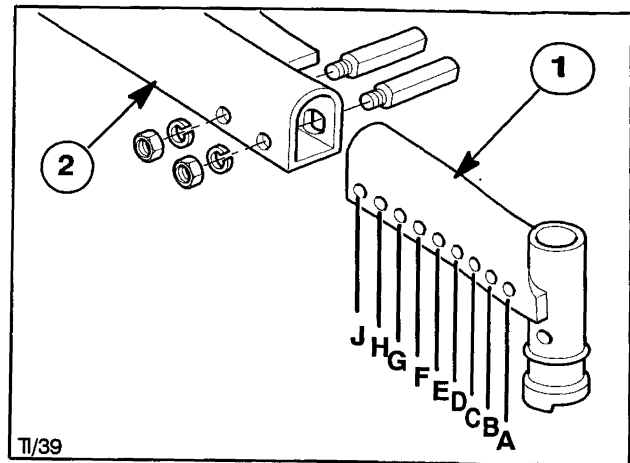


2-203

Reset the left (1) and right-hand axle telescopic sections, passing the securing bolts through the center beam (2) and telescopic sections, as indicated in the figure and the following table:

Track Setting in. (mm)		Securing Bolt Locations	
60.8	(1545)	A	C
64.8	(1645)	B	D
68.7	(1745)	C	E
72.6	(1845)	D	F
76.6	(1945)	E	G
80.5	(2045)	F	H
84.5	(2145)	G	J

NOTE: The track settings shown may vary by up to 0.2 in. (5 mm), dependent upon tire size. The front wheel discs are off-set relative to the center line of the rim. The track settings in the tables above are with the dished side of the wheel nearest the axle hub. If the front wheels are reversed on the hubs the track settings shown in the tables will be increased by approximately 1.8 in. (45 mm).



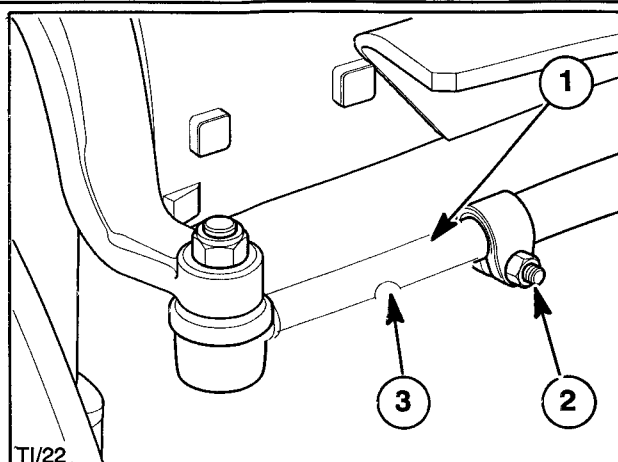
2-204

With both front wheels parallel, install the locating bolt (2), in the nearest aligning notch in the track control rod.

Tighten the power steering cylinder pivot pin nut to 217 lbf.ft. (294 Nm). Recheck the torque after 50 hours of operation.

Tighten the nuts on the axle extension securing bolts to 302 lbf.ft. (410 Nm). Tighten the nut on the locating bolt (2) to 33 lbf. ft. (45 Nm). Recheck all torque settings after 50 hours of operation.

Tighten the wheel disc to hub bolts to 230 lbf. ft. (314 Nm)



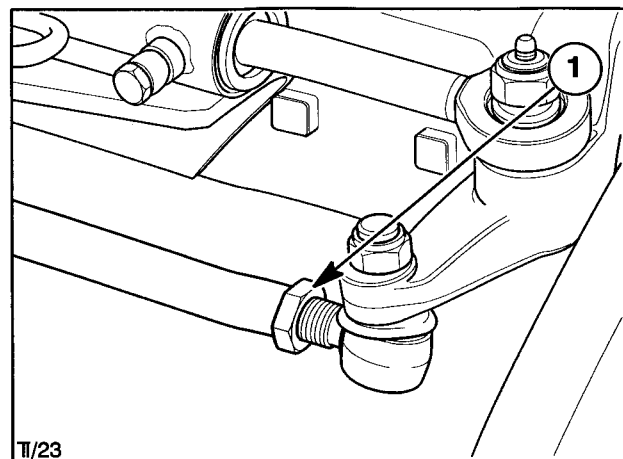
2-205

Front Wheel Toe-in

After resetting the track width, adjust the front wheel toe-in. For correct operation, the front wheels should be parallel or toe in slightly.

Measure the distance between the wheel rims at hub height at the **front** of the wheels. Rotate both front wheels 180° and check the measurements again, this time at the **rear** of the wheels. This will eliminate wheel rim run-out errors. The correct toe-in setting is 0 – 0.5 in. (0 – 13 mm), i.e. the measurement taken at the front of the rims should be the same as the rear or be smaller by up to 0.5 in. (13 mm).

Loosen the locknut (1), at the right end of the track rod. Remove the securing bolt (2) at the left track rod end Figure 2-205. Shorten or lengthen track rod assembly until the toe-in is correct making sure that bolt (2) is always installed and tightened to 33 lbf. ft. (45 Nm) before making measurements. Tighten the locknuts to 130 lbf. ft. (176 Nm). Recheck the torque settings after 50 hours of operation.



2-206



WARNING: Owners should ensure that all steering components are maintained in a reliable and satisfactory condition to ensure safe operation.

FRONT WHEEL TRACK ADJUSTMENT (front wheel drive)

WARNING: With a front wheel on a front wheel drive tractor supported on a stand, never attempt to rotate the wheel or start the engine. This may cause the rear wheels to move resulting in the tractor falling from the stand. Wheels should always be supported so that the tires are only just clear of the ground.

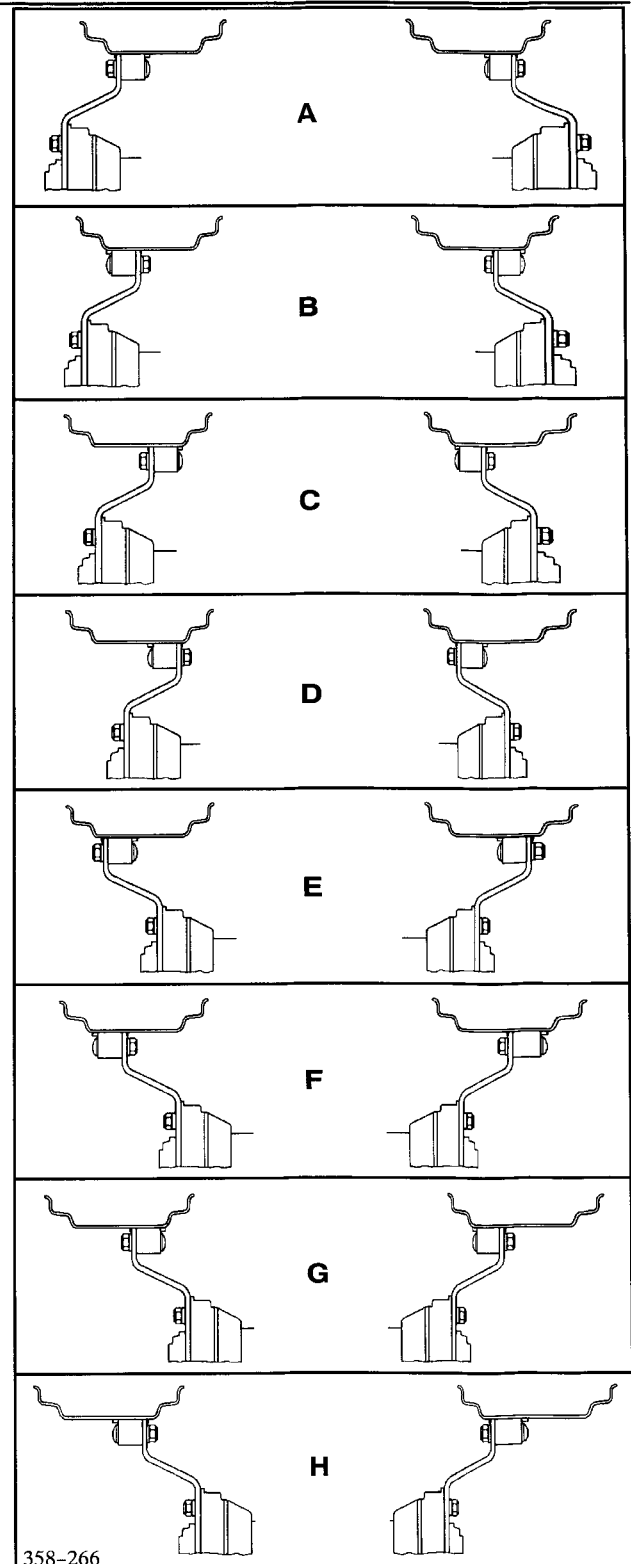
NOTE: When interchanging left and right-hand wheel assemblies, ensure the "V" of the tire tread remains pointing in the direction of forward travel.

Front wheel drive tractors have fixed axle assemblies. However the track width is fully adjustable by changing the wheel rim relative to the center disc, the rim and/or disc relative to the axle hub or by inter-changing both front wheels. (The track width is the distance between the center of each tire at ground level).

The sectioned drawings shown illustrate the wheel rim and disc positions relative to the hub at various track settings. The track widths available are as follows:

Track Setting	8160-8260 Tractors	8360-8560 Tractors
A	61.1 in. (1552 mm)	60.0 in. (1525 mm)
B	65.5 in. (1664 mm)	64.0 in. (1625 mm)
C	69.2 in. (1758 mm)	68.0 in. (1728 mm)
D	73.6 in. (1869 mm)	72.0 in. (1829 mm)
E	76.9 in. (1952 mm)	76.0 in. (1931 mm)
F	81.3 in. (2064 mm)	80.0 in. (2033 mm)
G	85.0 in. (2158 mm)	84.0 in. (2135 mm)
H	89.3 in. (2269 mm)	88.0 in. (2235 mm)

WARNING: Never operate the tractor with a loose wheel rim or disc. Always tighten nuts to the specified torque and at the recommended intervals. Owners should ensure that all steering components are maintained in a reliable and satisfactory condition to ensure safe operation.



2-207

NOTE: The track widths in the figure above, are nominal and may vary by up to 0.2 in. (5 mm) dependent upon tire size.

When reinstalling or adjusting a wheel, tighten the bolts to the following torques then re-check after driving the tractor for 200 yards (200 m), after 1 hour and 8 hours operation and, thereafter, at the 50 hour service intervals.

Use the following procedure to position the front wheels to obtain the desired track adjustment:

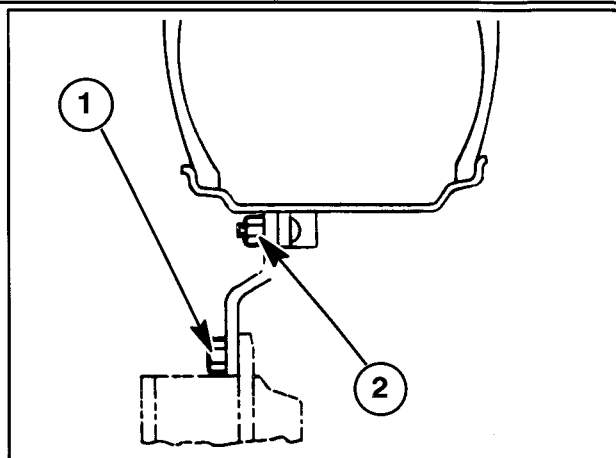
1. Position the front wheels straight ahead.
2. Apply the park brake and place blocks at the front and rear of the rear wheels.
3. Jack up the front axle and place on jack stands.
4. Remove the front wheel.
5. Position the wheel disc and rim as required to achieve the desired track adjustment.
6. Reinstall the wheel and torque the hardware in a diagonal pattern to the following:

Disc to hub nuts (1) 156 lbf.ft. (211 Nm)

Disc to rim nuts (2) 177 lbf.ft. (240 Nm)

NOTE: If the tractor is equipped with front fenders, ensure there is adequate clearance under all operating conditions including maximum turning angle and axle oscillation. Adjust the steering stops and or fender position, as necessary.

IMPORTANT: At the smaller track settings contact may occur between the tire or fender and the tractor when the wheels are turned to the full lock position particularly when the axle is fully articulated. To avoid this condition, adjust the fenders and/or steering stops.



2-208

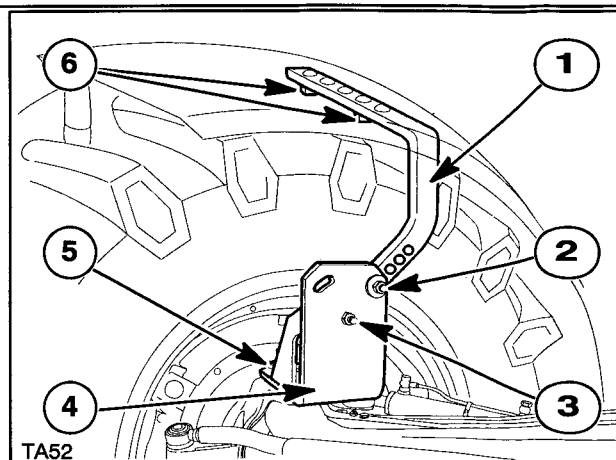
Front Fenders (where equipped)

The optional front fenders are adjustable to suit varying tire sizes and track width settings.

NOTE: After adjustment, ensure that there is at least 2.4 in. (60mm) clearance between the tire and any part of the fender or attaching hardware.

A fender may be moved horizontally, towards or away from the tractor, by relocating the bolts (6) in an alternative pair of holes in the fender support (1). The mounting bracket (4) is attached to the front axle by three bolts (5). Relocation of these bolts in another set of holes will allow the complete fender assembly to be moved.

The fender may be moved vertically by relocating the bolts (2) and (3) in the appropriate holes in the fender support (1). The bolt (2) passes through an elongated hole in the mounting bracket (4). Loosen the bolts (2) and (3), move the fender in an arc, as required, then tighten the bolts.



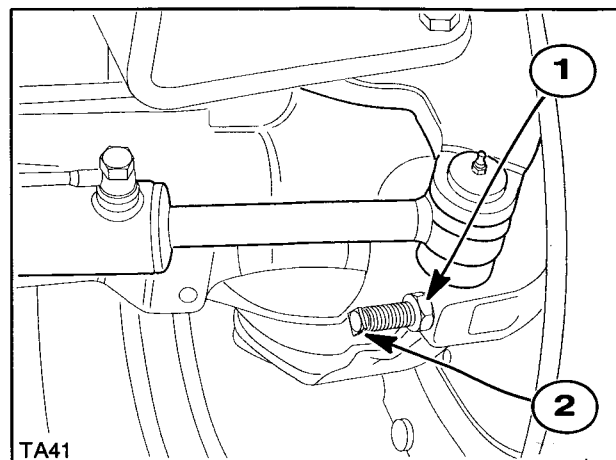
2-209

Steering Stops

Two steering stops are incorporated in the axle, one at each end. The stops are adjustable and should be set to provide a minimum clearance of 0.75 in. (20 mm) between the tires and any part of the tractor on full left and right lock with the axle fully oscillated.

To adjust, loosen the locknut (1) and turn the stop bolt (2) counterclockwise to reduce the steering angle of the wheels or clockwise to increase the steering angle. Tighten the locknut to 110 lbf. ft. (150 Nm).

NOTE: After adjusting steering stops, ensure that there is adequate clearance between the front tires and any part of the tractor with the axle fully turned and oscillated.

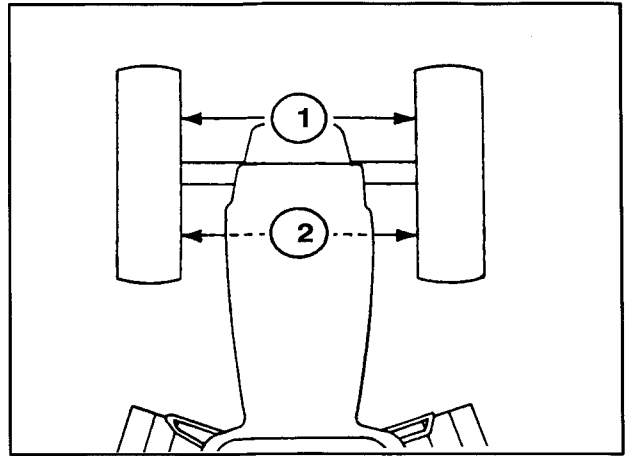


2-210

Front Wheel Toe-out

After resetting the track width, the front wheel toe-out may require adjustment. For correct operation, the front wheels should be parallel or toe **out** slightly.

Measure the distance between the wheel rims at hub height at the **front** of the wheels (1). Rotate both front wheels 180° and check the measurements again, this time at the **rear** of the wheels (2). This will eliminate wheel rim run-out errors. The correct toe-out setting is 0 – 0.25 in. (0 – 6 mm), i.e. the measurement taken at the rear of the rims should be the same as the front or be smaller by up to 0.25 in. (6 mm).

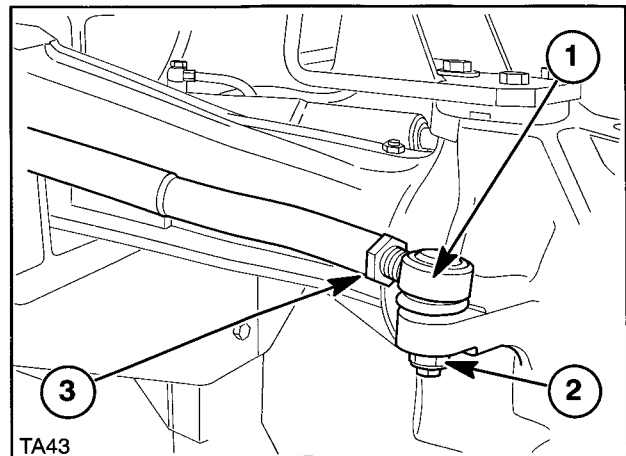


2-211

Should it be necessary to adjust the front wheel toe-out, proceed as follows:

Remove and discard the self-locking nut (2), on the left-hand end of the track control rod and extract the track rod end (1). Loosen the lock nut (3) and screw the track rod end into or out of the track rod to shorten or lengthen the assembly, as required. Re-insert the track rod end and, when the toe-out setting is correct, secure with a new self-locking nut. Tighten as follows:

Model	Nut (2)	Nut (3)
8160	72 lbf. ft. (98 Nm)	130 lbf. ft. (177 Nm)
8260	72 lbf. ft. (98 Nm)	130 lbf. ft. (177 Nm)
8360	87 lbf. ft. (118 Nm)	145 lbf. ft. (196 Nm)
8560	87 lbf. ft. (118 Nm)	145 lbf. ft. (196 Nm)

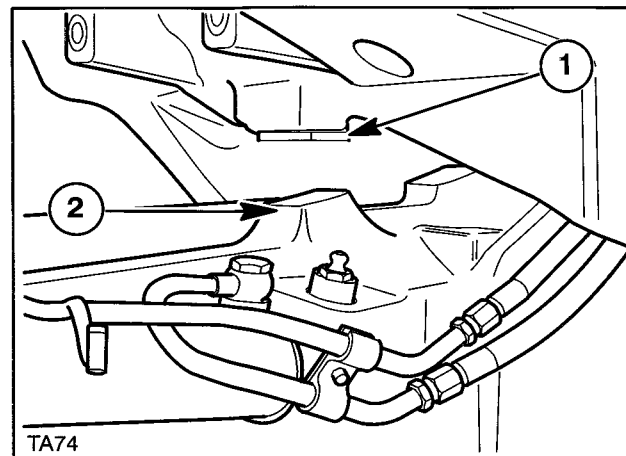


2-212

Front Axle Oscillation Stops

Axle oscillation stops are installed, one each side of the axle. Each stop consists of a plate (1), secured to the underside of the front axle support by two flush fitting, socket head screws. Oscillation of the axle causes the stop plate to contact the projection (2) on the axle casing, preventing further movement. With the stop plates in position, as shown, axle oscillation is 8°.

Extract the screws and remove the stop plates to increase axle oscillation to 12°.



2-213

NOTE: If the oscillation stops are removed, ensure that there is adequate clearance between the front tires and any part of the tractor with the axle fully turned in both directions and oscillated.

REAR WHEEL TRACK ADJUSTMENT (manual adjust wheels)

WARNING: The tractor is produced with lights which meet lighting regulations when operating or travelling on the public highway. If the wheel track setting is adjusted beyond the initial factory position then you may be required to reposition the lights or install auxiliary lighting to comply with legal requirements. Before traveling on the highway, ensure that the overall tractor width does not exceed the maximum permitted in your location.

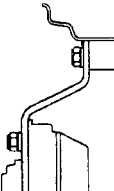
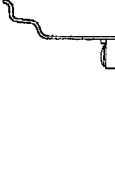
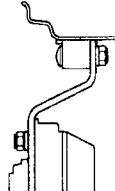
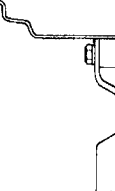
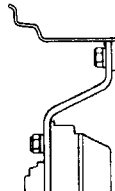
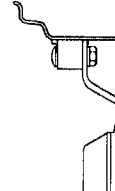
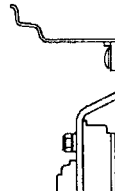
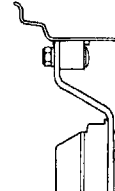
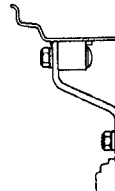
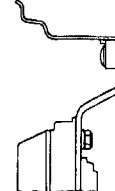
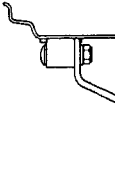
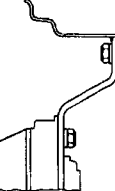

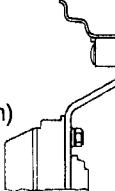

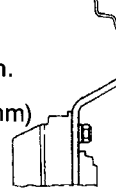
Rear wheel track adjustment is adjusted by changing the wheel rim relative to the center disc, the rim and/or the disc relative to the axle hub or by inter-changing the rear wheels.

WARNING: Tractor wheels are very heavy. Handle with care and ensure, when stored, that they cannot fall and cause injury.

The sectioned drawings shown in the table illustrate the wheel rim and disc positions relative to the hub at various track settings.

IMPORTANT: When interchanging left and right-hand wheel assemblies, ensure the "V" of the tire tread remains pointing in the direction of forward travel.

NOTE: With the larger tire sizes, the narrower track settings may not be attainable due to minimal clearance between tires and fenders or equipment. The dimensions shown in the chart are nominal. Track settings may vary by up to 0.2 in. (5mm), dependent upon tire size.

	60.2 in. (1530 mm)	
	64.2 in. (1630 mm)	
	68.2 in. (1732 mm)	
	72.1 in. (1832 mm)	
	76.0 in. (1930 mm)	
	79.9 in. (2030 mm)	
	83.9 in. (2132 mm)	
	87.9 in. (2232 mm)	

358-266



WARNING: *Never operate the tractor with a loose wheel rim or disc. Always tighten nuts to the specified torque and at the recommended intervals.*

When reinstalling or adjusting a wheel, tighten the bolts to the following torques then recheck after driving the tractor for 200 m (200 yards), after 1 hour and 8 hours operation and thereafter at the 50 hour service intervals:

1. Position the front wheels straight ahead.
2. Apply the park brake and place blocks at the front and rear of the front wheels.

3. Jack up the rear axle and place on jack stands.
4. Remove the rear wheel.
5. Position the wheel disc and rim as required to achieve the desired track adjustment.
6. Reinstall the wheel and torque the hardware in a diagonal pattern to the following:

Rear disc to hub nuts 188 lbf. ft. (255 Nm)

Rear disc to rim nuts

M16 nuts 177 lbf. ft. (240 Nm)

M18 nuts 330 lbf. ft. (450 Nm)

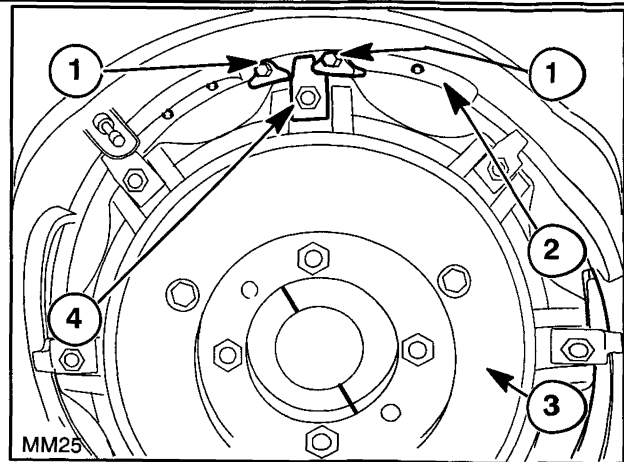
POWER ADJUST WHEELS (where equipped)

Dependent upon tractor model, power adjust wheels are available with a range of tire sizes and 38 in. diameter rims (rear wheels only). The advantage of these wheels is that the track width setting may be changed using engine power and without the need to jack up the tractor.

Power adjust wheels have cast iron center discs and are mounted on bar axles (see information later in this section).

A power adjusted wheel is shown. Each wheel disc (3) is clamped to rails welded to the rim to form a helix. Movement of the clamps along the rails will cause the rim to move in or out, relative to the wheel disc which is bolted to the axle.

Two of the rails (2) have a number of holes drilled in them at set intervals. Each of the drilled rails has a pair of stops (1) that are normally screwed into adjacent holes, either side of a clamp. The stops serve to positively locate one of the clamps (4). Relocation of the stops from one hole to the next will, when all the clamp bolts have been loosened, allow the wheel disc to be rotated, relative to the rim and tire to provide an alteration in track width.



2-215

Rear Wheel Track Settings – 16 and 18 in. width rims

The rear wheel discs are dished (concave) and the wheels are normally installed with the concave side toward the hub, as shown. This will provide a number of track width settings, as shown in the following table:

in.	(mm)
63.9*	(1624)*
67.9	(1724)
71.8	(1824)
75.8	(1924)
79.7	(2024)
83.6	(2124)
87.6	(2224)

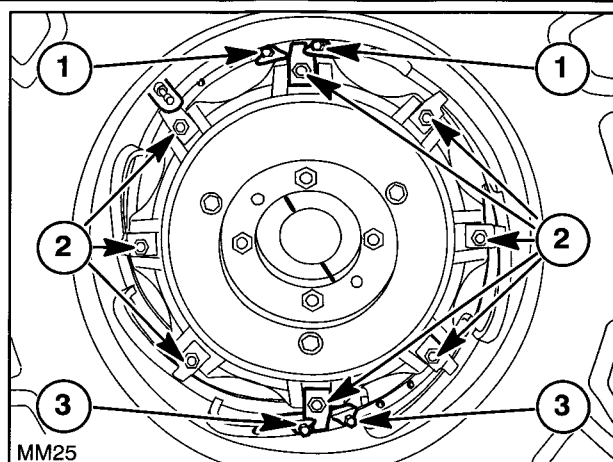
* This setting available with 18.4 – 38, and 20.8 – 38 tires only due to reduced clearance with the larger tire sizes.

Rear Wheel Track Settings – 15 in. width rims

By inter-changing the left and right wheels, when correctly installed, i.e., with the 'V' of the tire tread facing forward, the convex side of the wheel disc will be in contact with the hub. This will have the effect of moving the wheel away from the tractor to provide wider range of track width settings. See the following table:

Concave side of disc toward the tractor		Convex side of disc toward from the tractor	
in.	(mm)	in.	(mm)
setting not attainable		67.0	(1702)
59.8*	(1520)*	70.9	(1802)
63.9	(1622)	74.9	(1902)
67.8	(1722)	78.8	(2002)
71.7	(1822)	82.8	(2102)
75.7	(1922)	86.7	(2202)
79.6	(2022)	90.6	(2302)

* This setting available with 16.9 – 38 tires only



2-216

Power Adjust Procedure

IMPORTANT: To power adjust a **rear** wheel, the drive to the front wheels must be **disengaged**. Ensure that the differential lock is disengaged before power adjusting a rear wheel.

Power Adjust Procedure – Left-hand Wheel

Position the left-hand wheel with a pair of stops at the top (1) and at the bottom (3), as shown.

Loosen the nuts (2) on all the clamp attaching bolts.

If an **increase** in track width is required, remove the stop to the **right** of the **lower** clamp and to the **left** of the **upper** clamp. Relocate both clamps in the appropriate holes in the rail.

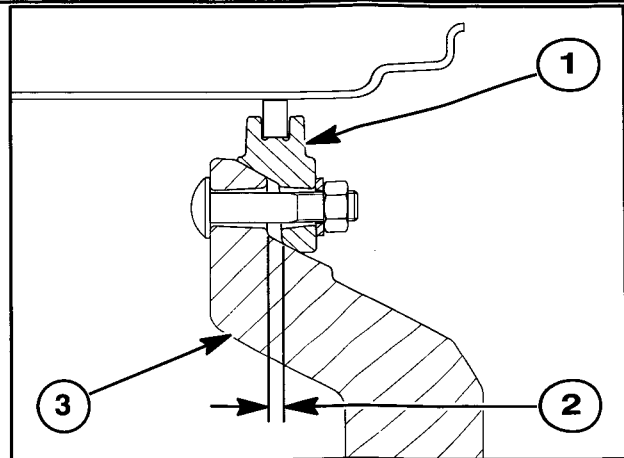
NOTE: If the wheel is to be adjusted to the minimum or maximum setting within a range, then remove one stop from each pair. The bend in the end of the rail will act as a stop. The minimum track setting may not be attainable due to minimal clearance between tires and fenders and/or the tractor.

With the engine running, select a low **forward** gear, apply the **right-hand** footbrake, release the handbrake and engage the clutch. Forward rotation of the center disc will cause the **left-hand** rim to move **outwards**.

Conversely, relocate the **lower left-hand** stop and the **upper right-hand** stop. Select a low **reverse** gear, apply the **right-hand** footbrake, release the handbrake and engage the clutch to move the **left-hand** rim **inwards**.

Re-locate the remaining stops against the other side of the clamps. Tighten all clamp nuts uniformly, half a turn at a time, until a torque of 180 lbf.ft (245 Nm) is obtained. 'Seat' the clamps using a hammer and hardwood block then re-torque the nuts to 180 lbf.ft (245 Nm).

IMPORTANT: *Visually check the gap (2), between each clamp (1) and the wheel disc (3). The gap should not vary by more than 0.125 in. (3 mm) between any of the clamps otherwise the rim and tire will not run true and excessive side loads will be imposed on one or more of the rails.*



2-217

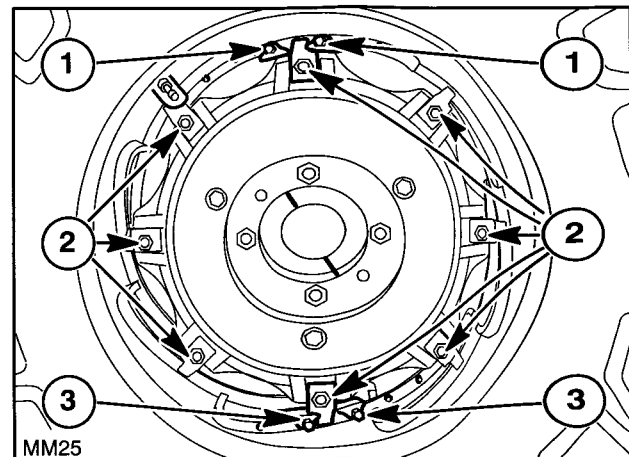
Power Adjust Procedure – Right-hand Wheel

Position the right-hand wheel with a pair of stops (1) at the top and bottom (3). Loosen the nuts on all the clamp attaching bolts (2).

If an **increase** in track width is required, remove the stop to the **right** of the **lower** clamp and to the **left** of the **upper** clamp. Relocate both clamps in the appropriate holes in the rail.

With the engine running, select a low **reverse** gear, apply the **left-hand** footbrake, release the handbrake and engage the clutch. Rearward rotation of the center disc will cause the **right-hand** rim to move **outwards**.

Conversely, relocate the **lower left-hand** stop and the **upper right-hand** stop. Select a low **forward** gear, apply the **left-hand** footbrake, release the handbrake and engage the clutch to move the **right-hand** rim **inwards**.



2-218

Tighten the stop screws to 33 lbf.ft. (45 Nm).

Re-locate the remaining stops against the other side of the clamps. Tighten all the clamp nuts uniformly and recheck at the appropriate intervals, as previously described for the left-hand wheel.

Drive the tractor for approximately 200 yards (200 m) and check the clamp nut torques. Recheck the torque settings after 1 hour and 8 hours operation and thereafter at the 50 hour service interval.

Changing Rear Wheel Track Width Range

To change from one track width range to another, it is necessary to remove the rear wheels and reposition them on the other side of the tractor. This will provide an alternative, wider range of track settings, as shown in the table earlier in this section.



WARNING: *Tractor wheels are very heavy. Handle with care and ensure, when stored, that they cannot fall and cause injury.*

Block the front wheels and jack up and support the rear axle. Remove the disc to hub bolts. Using a suitable lifting device, remove the wheel and store the wheel and tire where it won't fall over. Repeating

the procedure, remove the opposite wheel and install it on the hub from which the first wheel was removed.

IMPORTANT: *When interchanging left and right-hand wheel assemblies, ensure the "V" of the tire tread remains pointing in the direction of forward travel.*

Tighten the rear disc to hub nuts uniformly, half a turn at a time, until a torque of 180 lbf.ft (245 Nm) is obtained.

NOTE: *Check bolt torque after driving the tractor for 200 yards (200 m), after 1 hour and 10 hours of operation and thereafter at the 50-hour service intervals.*



WARNING: *Never operate the tractor with a loose wheel rim or disc. Always tighten nuts or bolts to the specified torque and at the recommended intervals.*

After changing the rear wheels from side to side, power adjust, as previous described, to obtain the required track setting.

BAR AXLE (where equipped)

INTRODUCTION

All models equipped with a bar axle have power adjust wheels with cast iron center discs or cast hubs and steel wheels. Bar axles are available in two lengths:

96 in. (2440 mm) – Providing a range of track width settings from 59.8 in. (1520 mm) to 80 in. (2030 mm).

112 in. (2845 mm) – Providing a range of track width settings from 59.8 in. (1520 mm) to 96 in. (2440 mm).

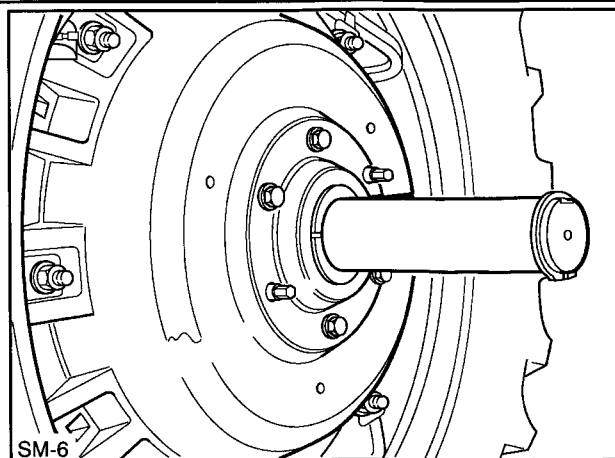
The track width setting may be varied by using the manual or power adjust the wheels, as previously described, or by moving the complete wheel/hub assemblies in or out on the axle shaft or by a combination of the two methods.



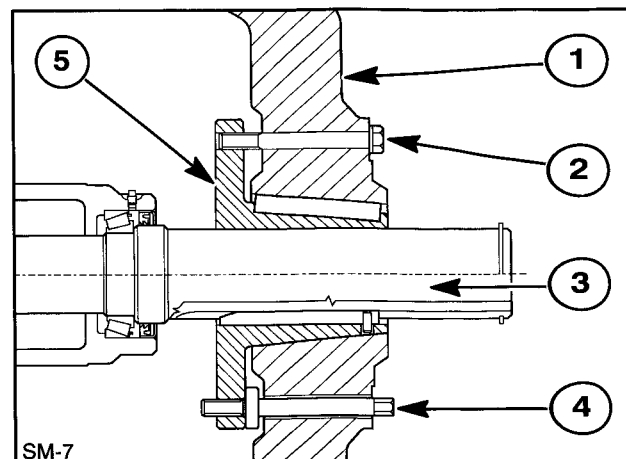
WARNING: *Your tractor is produced with lights that meet lighting regulations when operating or travelling on public roads. If the wheel track setting is adjusted beyond the initial factory position, you may be required to reposition the lights or fit auxiliary lighting to comply with legal requirements. Before travelling on public roads, make sure that the overall tractor width does not exceed the maximum permitted in your locality.*

NOTE: *With the larger width tires, it may not be possible to move the wheels to the narrower settings due to limited clearance between the tire and fender.*

The figure shows a cross-section through the wheel/axle assembly. The wheel disc (1) is bolted to a conical hub (5) which is split into two parts. The action of tightening the wheel disc to hub bolts (2) will pull the conical hub into the centre of the disc and clamp the hub onto the axle shaft (3). The screw (4) is used to 'jack' one half of the split hub away from the wheel disc to unclamp the assembly from the axle shaft.



2-219



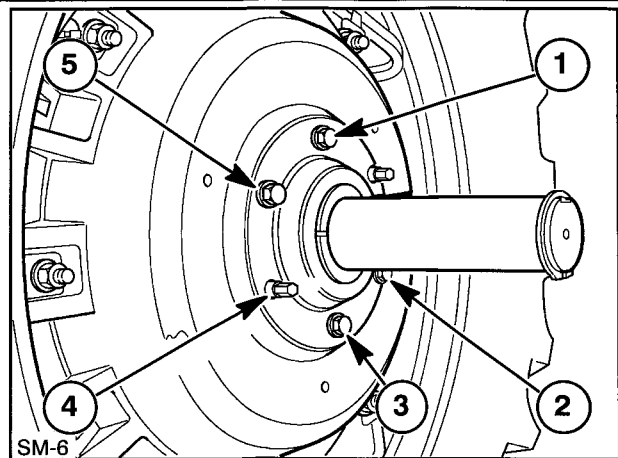
2-220

MOVING A WHEEL ON THE AXLE SHAFT

Block the front wheels and jack up and support the rear axle.

Adjustment of the track setting is achieved by sliding the complete wheel/hub assembly on the axle shaft. Moving the wheel inwards (toward the tractor) will reduce track width. Moving the wheel outwards will increase track width.

Loosen the two wheel disc to hub bolts (3) and (5) either side of the jack bolt (4), by approximately 0.5 in. (12 mm). Unscrew the jack bolt (4) which will free one half of the conical hub and push it away from the wheel disc. When the hub becomes free, stop turning the jack bolt.

**2-221**

Slide the complete wheel and hub assembly along the axle shaft to the required position. Tighten the jack bolt to 33 lbf. ft. (45 Nm) then tighten the two bolts (3) and (5) uniformly, half a turn at a time, until a torque of 216 lbf.ft (294 Nm) is obtained.

Repeat the procedure on the other wheel, making sure that both wheels are the same distance from the outer ends of the axle shaft.

NOTE: After driving the tractor for 200 yards (200 m), check the torque of all **four** disc to hub bolts (1), (2), (3) and (5) on both wheels. Recheck the torques after 1 hour and 10 hours of operation and thereafter at the 50-hour service intervals.



WARNING: Never operate the tractor with a loose wheel or hub. Always tighten hardware to the specified torque and at the recommended intervals.

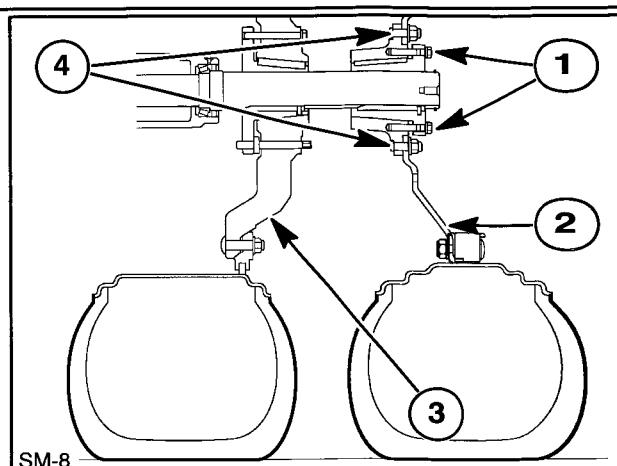
DUAL WHEELS (where equipped)

Dual rear wheels are available as a factory installed option or dealer installed accessory, in conjunction with the 112 in. (2845 mm) bar axle. The dual wheel kit consists of an additional pair of non-adjustable steel wheels, hubs and wheel-to-hub attaching hardware.

A maximum 120 in. (3048 mm) track spacing can be obtained by installing dual wheels on the bar axle.

Before the outer wheels can be installed, the inner wheels must be adjusted to the minimum attainable track width, as described in the previous text.

The figure shows correct wheel installation. The inner wheel (3) is clamped onto the bar axle. The outer steel wheel (2) is attached to the hub by eight bolts (4). The hub is clamped to the bar axle by the four bolts (1) in a similar manner to the cast, inner wheel or hub.

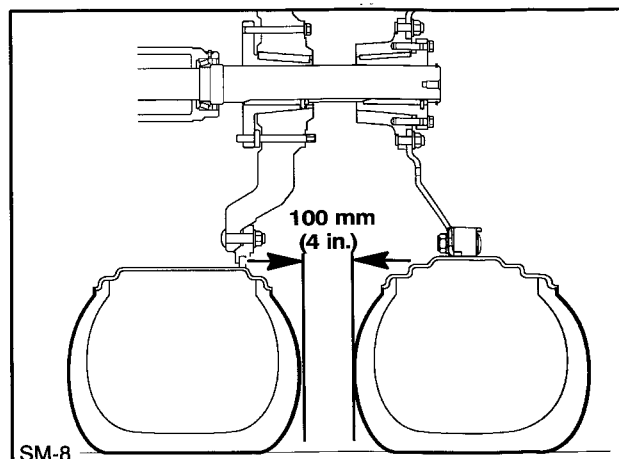


2-222

A minimum clearance of 4 in. (100 mm) must be maintained between the closest points of the tire walls. The clearance should be checked with the tractor correctly ballasted and the attached implement in the raised position.

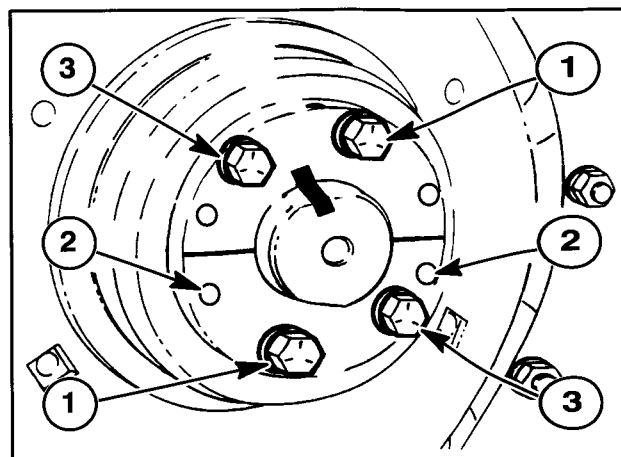
To move the inner wheel on the axle shaft, follow the procedure outlined on the previous page. To move a steel disc wheel, proceed as follows:

Block the front wheels and jack up and support the rear axle.



2-223

Loosen the two opposed wedge bolts (1) approximately 0.5 in. (12 mm). Remove the other two wedge bolts (3). These will be used as jack screws in the threaded holes (2).



2-224

OPERATION

The removed bolts and the threaded holes in the wedges, should be cleaned and lubricated. Install the bolts in the threaded holes in the lower wedge at (1). These bolts are used as jack bolts to push against the wedges. Tighten the two jack bolts evenly until the wedges loosen on the axle shaft. The wheel assembly will now be free to slide in or out on the axle shaft.

Set the wheel to the desired position on the shaft. Remove the jack bolts and replace them in their original holes (2).

Tighten all four wedge retaining bolts uniformly, half a turn at a time, until a final torque of 216 lbf. ft. (294 Nm) is achieved.

IMPORTANT: *The wedge bolts must be tightened evenly.*

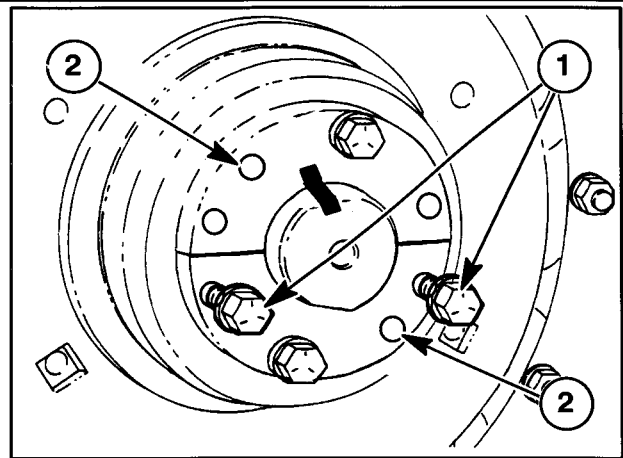
Repeat the procedure on the other wheel, making sure that both rear wheels are the same distance from the outer ends of the axle shafts.

NOTE: *Check the torque of all four wedge retaining bolts on each wheel after driving the tractor for 200 m (200 yards), after 1 hour and 10 hours operation and thereafter at the 50-hour service intervals.*



WARNING: *Never operate the tractor with a loose wheel rim or disc. Always tighten nuts to the specified torque and at the recommended intervals. Specified torques are as follows:*

Disc to hub nuts (cast iron wheel discs)	216 lbf. ft. (294 Nm).
Disc to hub nuts (steel wheel discs)	216 lbf. ft. (294 Nm).
Wedge retaining bolts (all models)	216 lbf. ft. (294 Nm).
Disc to rim clamp nuts (cast iron wheel discs)	180 lbf. ft. (245 Nm).
Disc to rim nuts (steel wheel discs – 34 in. rims)	177 lbf. ft. (240 Nm).
Disc to rim nuts (steel wheel discs – 38, 42, 48 in. rims)	207 lbf. ft. (280 Nm)



2-225

BALLASTING AND TIRES

GENERAL

Maximum tractor performance is dependent upon proper ballasting and tire selection. Maximum efficiency will be achieved when tractor weight is correct for the application.

Selecting the proper size and type of front and rear tires is also important in achieving maximum tractor efficiency. Various sizes and types of tires are available for your tractor and your dealer can assist you with this subject.

The tires selected for your tractor must be able to support the weight of the tractor and equipment and must also be able to provide adequate traction to utilize the tractor horsepower and turn it into useful drawbar horsepower.

If your tractor has radial tires, you will find that they produce superior performance over similar size bias ply tires. You will have to adjust the ballast, tire pressure and tractor weight, split between the front and rear axles for various loads and conditions to achieve the best ride and performance.

Always maintain the correct air pressure in the tire to carry the load. Do not over inflate radial tires. Radial tires will work with lower air pressures and will show up to 20% sidewall deflection or bulge when correctly inflated.

The force that enables the tires to drive the tractor must be transmitted through the tire sidewalls. Tires work best when both the tires on a given axle are working at the same rate.

Factors Affecting Tire Performance

- Correct air pressure for the load
- Correct sidewall deflection
- Correct wheel slip
- Correct tire size for expected load
- Correct fill of liquid ballast
- Maintaining equal tire pressure in both tires on a given axle

Selecting Ballast

When tractor horsepower loads vary, the optimum weight of the tractor will change. This means that ballast may have to be added or removed to maintain the best tractor performance. Proper ballast will greatly improve tractor operation and ride.

Always treat all tires on a tractor axle equally when selecting ballast and tire pressure.

The amount of ballast required is affected by:

- Shipping weight of tractor
- Soil and traction conditions
- Type of implement: fully-mounted, semi-mounted or trailed
- Working speed
- Tractor horsepower load
- Type and size of tires
- Tire pressures

Do not use more ballast than needed. Excess ballast should be removed when it is not required.

Do not add excessive weight to the tractor to pull heavy loads. Reduce the load because pulling a lighter load at a higher ground speed is more efficient and easier on the tractor.

NOTE: *Heavy draft loads should not be continually pulled in a gear that results in the engine laboring at ground speeds below 5 MPH (8 km/h). Reduce the load as required to achieve required ground speeds.*

Too little ballast:

- Rough ride
- Excessive wheel slip
- Power loss
- Tire wear
- Excessive fuel consumption
- Lower productivity

Too much ballast:

- Higher maintenance costs
- Increased driveline wear
- Power loss
- Increased soil compaction
- Excessive fuel consumption
- Lower productivity

For maximum performance in heavy draft conditions weight should be added to the tractor in the form of cast iron weights, liquid ballast, or a combination of both.

Front end ballast may be required for stability and steering control when weight is transferred from the front to the rear wheels as rear mounted implement is raised by the tractor 3-point linkage.

When a rear mounted implement is raised to the transport position, the weight on the front wheels should be at least 20% of total tractor weight.

For optimum performance and efficiency, two wheel drive tractors should be ballasted so that approximately 30% of the total tractor weight (less implement) is on the front wheels. Ideal tire slip for 2WD tractors is 10–15%.

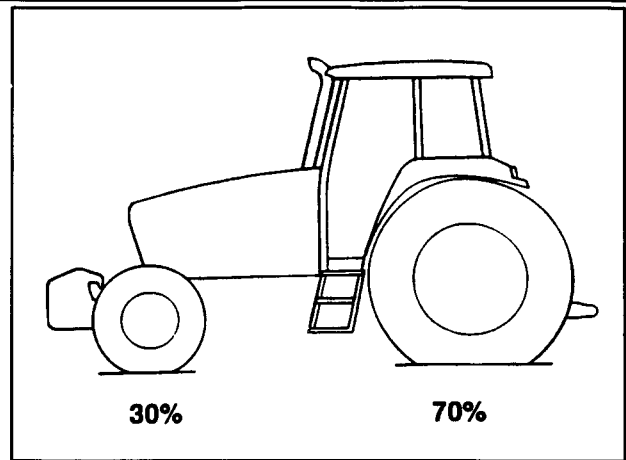


CAUTION: *Additional front ballast may be needed when transporting large 3-point mounted equipment. Always drive slowly over rough terrain, no matter how much front ballast is used.*

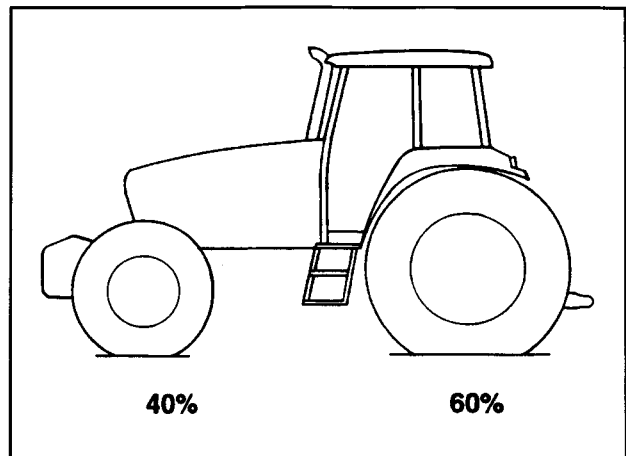
Front wheel drive tractors should be ballasted so the weight on the front wheels is approximately 40% of the total tractor weight. Ideal tire slippage for FWD tractors is 8–12%.

Add additional front end ballast, as required, for stability during operation and transport. Ballasting of the front end may not always provide adequate stability if the tractor is operated at high speed on rough terrain. Reduce tractor speed and exercise caution under these conditions.

IMPORTANT: *Only sufficient weight should be added to provide traction and stability. Adding more weight than necessary results in unnecessary loads being imposed on the tractor and a higher fuel consumption. When adding weight, adhere to the maximum tire capacity loading stated in the tables on later in this section. If further information or assistance is required on tractor weighting consult your dealer.*



2-226



2-227

CHECKING WHEEL SLIPPAGE

A good way to monitor ballasting requirements is to check the drive wheel slippage. Slippage should be 8-15% in normal field conditions.

If the drive wheels slip excessively, more weight may be required. However, remember that excessive load and/or poor traction conditions will also cause excessive wheel slip.

Wheel slippage will vary as field conditions change, so always check slippage several times and average the results. Remove weight if slippage is less than 8%.

Wheel slippage is measured automatically by the optional radar in the Tractor Performance Monitor.

Wheel slippage can also be measured manually as described below.

1. Mark a tire with a large white mark.
2. With the tractor fully loaded, mark a starting point on the ground.
3. Keep tractor loaded and mark the ground again when tire completes 10 full revolutions.
4. Drive back over the course again at working speed, with implement raised. Count tire revolutions between the same two marks.
5. Use second count of tire revolutions and the wheel slippage chart to determine percentage of slippage.

NOTE: A rate of 10-15 percent for two-wheel-drive or 8-12 percent for FWD equipped tractors is ideal.

6. Adjust ballast or load to give correct slippage.

NOTE: Available drawbar horsepower is reduced when wheel slip drops below 8 percent because energy is wasted carrying excess weight on the tractor.

Wheel Slippage Chart

Wheel Revolutions Counted in Step 4	% Slip	Result
10	0	Remove Ballast
9-1/2	5	
9	10	Proper Ballast
8-1/2	15	
8	20	Add Ballast
7-1/2	25	
7	30	

Ballast Limitations

Ballast should be limited by the tire capacity or tractor capacity. Each tire has a recommended carrying capacity which should not be exceeded, (see later in this section).

If a greater amount of weight is needed for traction, larger tires should be used.

Ballast can be added by bolting on cast iron weights or by adding liquid calcium chloride in the tires. Bolt-on cast iron weights are recommended because they can easily be removed when not needed.

IMPORTANT: Do not exceed the tractor gross vehicle weight shown below. This can cause an overload condition that may invalidate the warranty and may exceed the load rating of the tires. The maximum recommended gross vehicle weight is the weight of the tractor plus ballast plus any mounted equipment such as sprayers, tanks etc. in the raised position. See the following table:

Model	Maximum Gross Vehicle Weight	
	lbs.	kg.
8160	16,530	7500
8260	17,640	8000
8360	19,840	9000
8560	20,945	9500

OPERATION

Individual axles are also subject to weight limitations as follows:

Model	Max 2WD Axle Weight		Max FWD Axle Weight		*Max FWD Axle Weight		Max Rear Axle Weight	
	lbs.	kg.	lbs.	kg.	lbs.	kg.	lbs.	kg.
8160	5730	2600	7715	3500	13225	6000	14330	6500
8260	6615	3000	7715	3500	13225	6000	14330	6500
8360	7935	3600	9920	4500	15430	7000	16535	7500
8560	7935	3600	9920	4500	15430	7000	16535	7500

* Restricted operation of FWD axles. The axle loading may be increased, provided that ground speed does not exceed 8 MPH (13 kph) and wheel track settings don't exceed 76 in. (1930 mm).

CAST IRON WEIGHTS

Up to three cast iron weights (1), may be added to the outside of each rear wheel as follows:

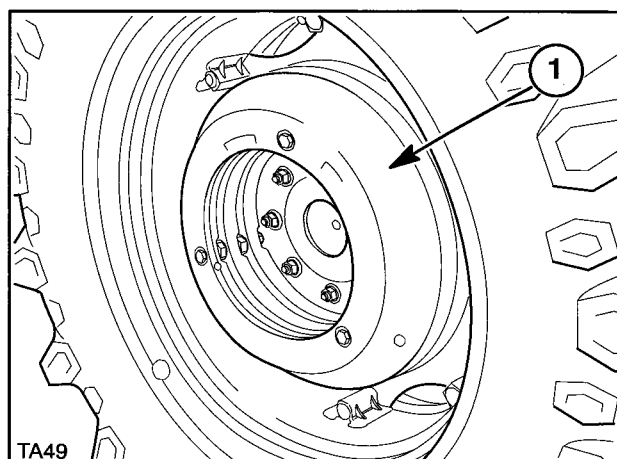
Model	Weight (each)	Total Axle Weight
8160	110 lbs. (50 kg.)	661 lbs. (300 kg.)
8260	110 lbs. (50 kg.)	661 lbs. (300 kg.)
8360	143 lbs. (65 kg.)	860 lbs. (390 kg.)
8560	143 lbs. (65 kg.)	860 lbs. (390 kg.)

The front end wafer weights are available as a set of 10 or for 8360 and 8560 tractors as a double set of 20 (Figure 2-230). The weight sets and carriers add front ballast as follows:

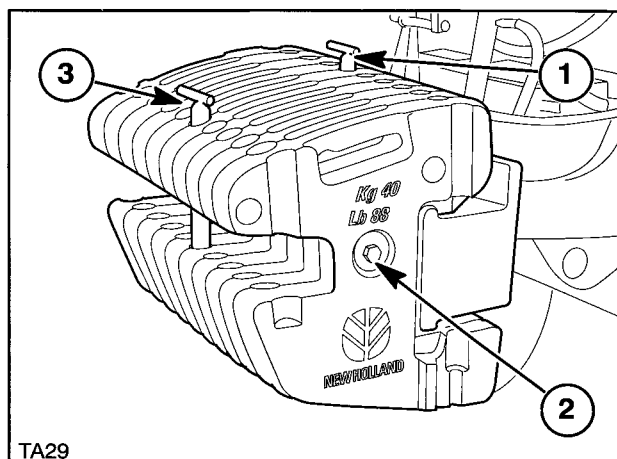
Model	Weight	Carrier	Total Weight
8160, 8260	10x88 lbs.	165 lbs.	1047 lbs.
	(10x40 kg.)	(75 kg.)	(475 kg.)
8360, 8560	10x88 lbs.	198 lbs.	1080 lbs.
	(10x40 kg.)	(90 kg.)	(490 kg.)
8360, 8560	20x88 lbs.	440 lbs.	2200 lbs.
	(20x40 kg.)	(200 kg.)	(1000 kg.)

The single set of weights is mounted on a carrier bolted to the front axle support and is secured by a central locking pin (1) and clamp bolt (2). After removing the central locking pin the weights may be removed as a complete set with the aid of suitable lifting equipment.

The weights can be removed individually, after removing the clamp bolt (2). The tow pin (3) is secured in place by an 'R' clip passing through the center of the pin.



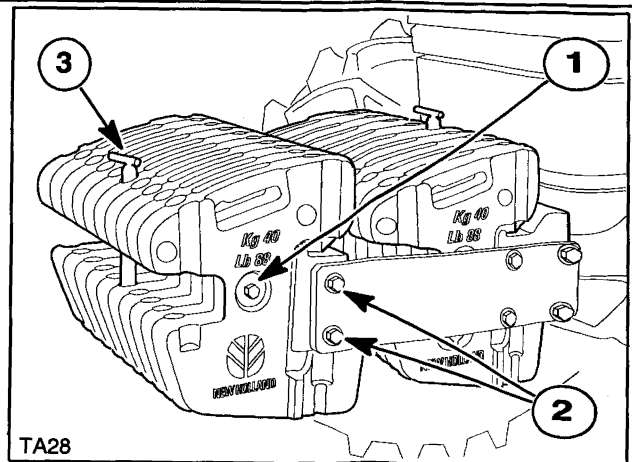
2-228



2-229

OPERATION

The second set of weights, mounted on a carrier, is mounted in front of the first set by means of two heavy duty brackets bolted to the carrier on the front axle support. The second set is secured by a clamp bolt (1). With the aid of suitable lifting equipment, the weights may be removed as a complete set, complete with carrier, after removal of the bolts (2). The weights may be removed individually, after removing the clamp bolt (1). The tow pin (3) is secured in place by an 'R' clip passing through the center of the pin.



2-230

WARNING: *The tractor must not be operated unless both the central locking pin and the clamp bolt is in position with the nut tightened to 125 lbf.ft. (169 Nm). Recheck the nut torque after 50 hours of operation if the nut has been disturbed for any reason.*

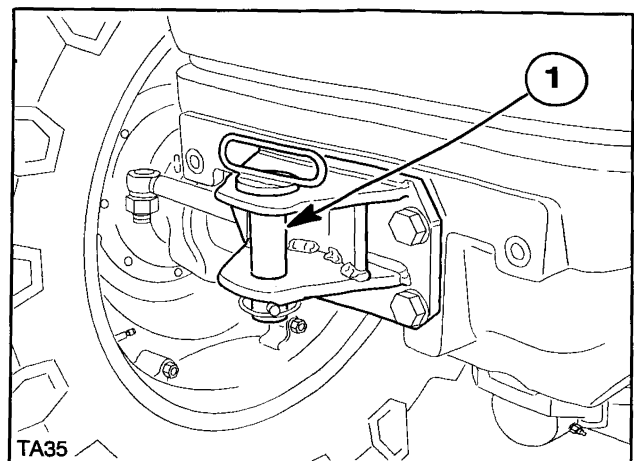
If front weights are not required, a tow pin (1) is available for bolting directly to the front axle support.

LIQUID BALLAST

Filling the front and rear tires with liquid ballast is a convenient method of adding weight. A solution of calcium chloride and water is recommended. This gives a low freezing point and provides a higher density than plain water.

IMPORTANT: *With radial tires NEVER fill any tire up to more than 40-50 percent. More liquid ballast solution will leave too little air space to absorb shocks.*


NOTE: *When filling a tire with calcium chloride/water solution the valve should be at the highest point on the wheel. The valve should be at the lowest point when checking or adjusting air pressure if the tire contains liquid ballast. Special equipment is required to water ballast tires. See your authorized dealer or tire supplier for details.*



2-231

The table shows the quantity of calcium chloride and water required for each tire size option and is based on 5 lb. (0.6 kg) of calcium chloride per gal/liter of water. The figures in the table will give a 75% fill of the tire.

This calcium chloride/water solution will give protection from freezing down to an ambient temperature of -50°C (-58°F).

 **WARNING:** When mixing the ballast solution it is imperative the calcium chloride flakes are added to the water and the solution stirred until the calcium chloride is dissolved.

Never add water to calcium chloride as considerable heat is generated. If the flakes should contact the eyes, wash the eyes immediately with clean, cold water for at least 5 minutes. Consult a doctor as soon as possible.

Front Tires

Tire Size	Water Gal./Liters	CaCl ₂ Lbs./Kg.	Total Wt. Lbs./Kg.
10.00-16	15/58	69/31	184/84
11.00-16	20/77	93/42	267/121
14L-16.1	23/88	110/50	307/139
14.9-24	38/114	190/86	507/230
16.9-26	52/197	260/118	694/315
13.6-28	35/132	175/79	467/211
14.9-R28	43/63	215/98	574/261
16.9-R28	56/212	280/127	747/339
14.9-R30	46/174	230/104	614/278

The above weights are based on 75% fill. Radial tires should only be a 40-50% fill. Calculate weight as required.

Rear Tires

Tire Size	Water Gal./Liters	CaCl ₂ Lbs./Kg.	Total Wt. Lbs./Kg.
18.4-34	81/307	405/184	1081/491
16.9-38	73/276	365/166	974/442
18.4-38	89/337	445/202	1187/539
20.8-38	114/431	570/259	1521/690
18.4-42	93/352	465/211	1240/563
14.9-46	65/246	325/147	867/393

The above weights are based on 75% fill. Radial tires should only be a 40-50% fill. Calculate weight as required.

Some sloshing of the liquid ballast may be noticed when the tractor is first stopped. This is normal.


TIRE INFLATION

Upon receiving your tractor, check the air pressure in the tires and recheck every 50 hours or weekly.

When checking tire pressures, inspect the tires for damaged tread and side walls. Neglected damage will lead to early tire failure.

Inflation pressure affects the amount of weight that a tire may carry.

Locate the tire size for your tractor in the Tire Pressure and Load tables later in this section. Do not exceed the load for the pressures listed. Do not over or under inflate the tires.

 **WARNING:** Inflating or servicing tires can be dangerous. Whenever possible, trained personnel should be called in to service or install tires. To avoid the possibility of serious or fatal injury, follow the safety precautions below:

- Never attempt tire repairs on a public road or highway.
- Do not inflate a steering tire above the manufacturer's maximum pressure shown on the tire or beyond the maximum shown in the Tire Pressure and Load tables if the tire is not marked with the maximum pressure.
- Never inflate a traction tire (front wheel drive tractor or any rear tire) over 35 lbf/in² (2.4 bar). If the bead does not seat on the rim by the time this pressure is reached, deflate the tire, relubricate the bead with a soap/water solution and re-inflate. Do not use oil or grease. Inflation **beyond** 35 lbf/in² (2.4 bar) with unseated beads may break the bead or rim with explosive force sufficient to cause a serious injury.
- After seating the beads, adjust inflation pressure to the recommended operating pressure.

OPERATION

- *Do not re-inflate a tire that has been run flat or seriously under-inflated until it has been inspected for damage by a qualified person.*
- *Torque wheel to axle nuts to specification after re-installing the wheel. Check nut tightness daily until torque stabilises.*
- *Refer to tractor weighting section before adding ballast to the tires.*
- *Ensure the jack is placed on a firm, level surface.*
- *Ensure the jack has adequate capacity to lift the tractor.*
- *Use jack stands or other suitable blocking to support the tractor while repairing tires.*
- *Do not put any part of your body under the tractor or start the engine while the tractor is on the jack.*
- *Never hit a tire or rim with a hammer.*
- *Ensure the rim is clean and free of rust or damage. Do not weld, braze, otherwise repair or use a damaged rim.*
- *Do not inflate a tire unless the rim is mounted on the tractor or is secured so that it will not move if the tire or rim should suddenly fail.*
- *When fitting a new or repaired tire, use a clip-on valve adaptor with a remote gauge that allows the operator to stand clear of the tire while inflating it. Use a safety cage, if available.*

FRONT WHEEL DRIVE TIRE COMBINATIONS

The tires fitted to tractors with optional front wheel drive have been carefully selected to match the gearing of the transmission and axles. When replacing worn or damaged tires, always install tires of the same make, model and size as those removed. The installation of other tire combinations may result in excessive tire wear, loss of useable power or severe damage to driveline components. If in doubt, consult your authorized dealer.

Radial Tire Identification

Radial tires are identified according to rating by a star code -- either one star (☆), two stars (☆☆) or three stars (☆☆☆).

Tires with ☆ are inflated to a maximum of 18 PSI or 1.2 bar.

Tires with ☆☆ are inflated to a maximum of 24 PSI or 1.6 bar.

Tires with ☆☆☆ are inflated to a maximum of 30 PSI or 2.0 bar.

Refer to the identification panel on the side of the tire sidewall.

TIRE PRESSURES AND PERMISSIBLE LOADS

IMPORTANT: The figures in the following charts are for guidance only. Tire specifications vary by tire manufacturer. For exact tire loading information, refer to the information provided by the manufacturer of the tires on the tractor.

To avoid the possibility of tire to rim creep, tire pressures below 6 PSI (0.40 bar) with radial tires and 12 PSI (0.80 bar) with bias ply should not be used for operations having a high torque requirement, e.g., subsoiling, plowing, heavy cultivation, etc.

Tire loading figures in the following tables are for a single wheel. To determine the maximum tire loading for single wheel applications, multiply the load figure in the table by two, the total number of wheels on the axle.

Example:

Rear

2 wheels (singles) x table figure = Maximum tire load

To determine the maximum tire loading for units with duals, multiply the load figure in the table by the total number of wheels on the axle, then multiply by 88%.

Example:

Rear

4 wheels (models with duals) x table figure x 88% = Maximum tire load

Axle loading must be within the capacities listed in Section 5 of this manual.

Remember the information in the charts and the examples cited are for guidance only. For exact information regarding inflation pressures and tractor loading, consult your authorized dealer or the tire manufacturer.

When front mounted implements are fitted, front tire loads may be increased by up to 35% with no increase in inflation pressure when operated at speeds not exceeding 12 MPH (20 KPH).

At speed not exceeding 5 MPH (8 KPH), the load on the front tires may be increased by 50% provided the inflation pressures are increased by 25%.

When mounted implements are used, rear tire loads may be increased by up to 20% with no increase in inflation pressure when operated at speeds not exceeding 12 MPH (20 KPH).

FRONT TIRE PRESSURES AND PERMISSIBLE LOADS (Two wheel drive)

TIRE SIZE	PLY	★RATING	INFLATION PRESSURE PSI															
			20	22	24	26	28	30	32	34	36	38	40	44	48	52	56	60
			LOAD CAPACITY - LBS.															
9.00-16	10	-			1960		2180		2380		2580		2760	2930	3100	3260		
10.00-16	10	-				1750	1950		2160		2310		2470	2630				
11.00-16	12	-					2300		2520		2720		2920	3100	3280	3450	3620	3780
14L-16.1	10	-			2850	2980	3110	3240	3370	3490	3610	3720	3840					

TIRE SIZE	PLY	★RATING	INFLATION PRESSURE Bar															
			1.40	1.50	1.70	1.80	1.90	2.00	2.20	2.30	2.50	2.60	2.75	3.00	3.30	3.50	3.80	4.00
			LOAD CAPACITY - kg															
9.00-16	10	-			888		988		1079		1169		1251	1328	1405	1478		
10.00-16	10	-				793	884		979		1047		1120	1192				
11.00-16	12	-					1043		1145		1234		1325	1406	1488	1565	1642	1715
14L-16.1	10	-						1161	1224	1306	1352	1411	1470	1529	1583	1637	1687	1741

FRONT TIRE PRESSURES AND PERMISSIBLE LOADS (Front wheel drive)

RADIAL TIRE SIZE	PLY	★RATING	INFLATION PRESSURE PSI																
			6	7	8	9	10	12	14	16	18	20	22	24	26	28	30	32	34
			LOAD CAPACITY - LBS.																
13.6-28		3	1470	1610	1740	1870	1990	2210	2420	2620	2830	2980	3160	3420	3480	3640	3740		
14.9-28	10	3	1760	1920	2080	2230	2370	2630	2880	3120	3300	3560	3760	3960	4140	4320	4540		
16.9-28	8	3	2130	2330	2520	2700	2870	3200	3500	3780	4080	4320	4560	4940					
14.9-30	10	3	1810	1980	2140	2300	2440	2720	2970	3220	3420	3660	3880	4080	4280	4460	4680		
16.9-30	8	2	2200	2410	2600	2790	3300	3620	3900	4180	4440	4700	5080						

RADIAL			INFLATION PRESSURE Bar																	
TIRE SIZE	PLY	★RATING	0.40	0.50	0.55	0.60	0.70	0.80	1.00	1.10	1.20	1.40	1.50	1.60	1.80	1.90	2.00	2.20	2.30	
LOAD CAPACITY – kg																				
13.6-28	10	3	665	730	790	850	905	1000	1100	1190	1285	1350	1435	1550	1580	1650	1700			
14.9-28	10	3	800	870	945	1010	1075	1195	1305	1415	1500	1615	1705	1800	1880	1960	2060			
16.9-28	8	3	965	1055	1145	1225	1300	1450	1590	1715	1850	1960	2070	2240						
14.9-30	10	3	820	900	970	1045	1105	1235	1345	1460	1550	1660	1760	1850	1940	2025	2120			
16.9-30	8	2	1000	1095	1180	1265	1345	1495	1640	1770	1900	2015	2130	2300						

FRONT TIRE PRESSURES AND PERMISSIBLE LOADS

BIAS PLY TIRE SIZE			PLY	★RATING	12	14	16	18	20	22	24	26	28	30	32	34	36
INFLATION PRESSURE PSI																	
LOAD CAPACITY - LBS.																	
14.9-24	8		2470	2700	2920	3130	3330	3520	3700	3880							
16.9-26	10		3100	3390	3660	3930	4170	4410	4640	4870	5080						
13.6-28	6		2210	2420	2620	2800	2980	3150									
14.9-28	10		2630	2880	3120	3340	3550	3750	3950	4140	4320	4500	4670				
16.9-28	8				3780	4050	4310	4560	4800	5030	5250						

BIAS PLY		INFLATION PRESSURE Bar														LOAD CAPACITY - kg													
TIRE SIZE	PLY	★RATING	0.80	1.00	1.10	1.20	1.40	1.50	1.60	1.80	1.90	2.00	2.20	2.30	2.40														
14.9-24	8		1122	1227	1327	1422	1513	1599	1681	1763																			
16.9-26	10		1409	1541	1664	1786	1895	2005	2109	2214	2309																		
13.6-28	6		1002	1097	1188	1269	1351	1428																					
14.9-28	10		1195	1309	1418	1518	1614	1705	1795	1882	1964	2045	2123																
16.9-28	8				1718	1841	1959	2072	2181	2286	2386																		

REAR TIRE PRESSURES AND PERMISSIBLE LOADS

RADIAL TIRE SIZE	PLY	★RATING	INFLATION PRESSURE PSI															
			6	7	8	9	10	12	14	16	18	20	22	24	26	28	30	
			LOAD CAPACITY - LBS.															
16.9-38	8	2	2470	2700	2920	3140	3340	3700	4060	4380	4680	5000	5280	5680				
18.4-38	8	2	2960	3240	3500	3760	3980	4440	4860	5260	5680	5980	6350	6600				
20.8-38	10	1	3580	3920	4240	4540	4840	5380	5880	6350	6800							
18.4-42	10	2	3120	3420	3700	3960	4200	4680	5120	5540	6000	6300	6650	6950				
14.9-46	8	3	2260	2470	2670	2860	3040	3380	3700	4000	4300	4560	4840	5080	5320	5560	5840	

REAR TIRE PRESSURES AND PERMISSIBLE LOADS

RADIAL			INFLATION PRESSURE Bar															
TIRE SIZE	PLY	★RATING	0.40	0.50	0.55	0.60	0.70	0.80	1.00	1.10	1.20	1.40	1.50	1.60	1.80	1.90	2.00	
LOAD CAPACITY – kg																		
16.9-38	8	2	1120	1225	1325	1425	1515	1630	1840	1985	2120	2270	2395	2575				
18.4-38	8	2	1345	1470	1590	1705	1805	2015	2205	2385	2575	2715	2880	3000				
20.8-38	10	1	1625	1780	1925	2060	2195	2440	2665	2880	3075							
18.4-42	10	2	1415	1550	1680	1795	1905	2125	2320	2515	2725	2860	3015	3150				
14.9-46	8	3	1025	1120	1210	1295	1380	1535	1680	1815	1950	2070	2195	2300	2415	2520	2650	

REAR TIRE PRESSURES AND PERMISSIBLE LOADS

BIAS TIRE SIZE	PLY	★RATING	INFLATION PRESSURE PSI												LOAD CAPACITY – LBS.											
			12	14	16	18	20	22	24	26	28	30	32	34												
18.4-34	8		3690	4040	4360	4680	4970																			
16.9-38	8		3260	3570	3860	4140	4400	4660	4890																	
18.4-38	8				5250	5630	5980																			
20.8-38	10				6360	6820	7250	7670																		
20.8-38	10				6360	6820	7250	7670																		

BIAS TIRE SIZE	PLY	★RATING	INFLATION PRESSURE Bar												LOAD CAPACITY – kg											
			0.80	1.00	1.10	1.20	1.40	1.50	1.60	1.80	1.90	2.00	2.20	2.30												
18.4-34	8		1673	1831	1977	2122	2253																			
16.9-38	8		1478	1618	1750	1877	1995	2113	2217																	
18.4-38	8				2387	2559	2718																			
20.8-38	10				1663	3100	3295	3486																		
20.8-38	10				2980	3100	3295	3486																		

HARDWARE TORQUE VALUES

Check the tightness of hardware periodically.

Use the following charts to determine the correct torque when checking, adjusting or replacing hardware on the tractor.

IMPORTANT: DO NOT use the values listed in the charts if a different torque value or tightening procedure is specified in this manual for a specific

application. Torque values listed are for general use only.

Make sure fastener threads are clean and not damaged.

NOTE: A torque wrench is necessary to properly tighten.

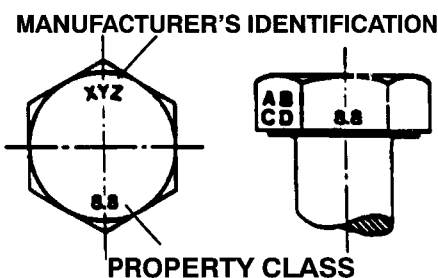
MINIMUM HARDWARE TIGHTENING TORQUES IN FOOT POUNDS (NEWTON-METERS) FOR NORMAL ASSEMBLY APPLICATIONS

METRIC HARDWARE AND LOCKNUTS

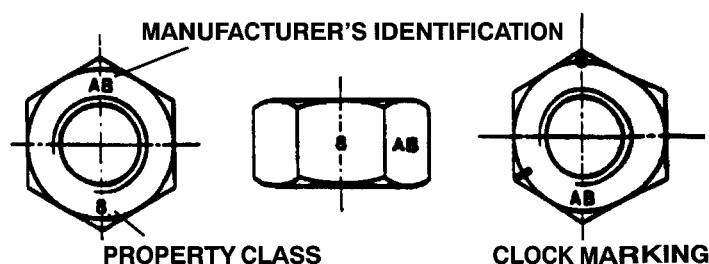
NOMINAL SIZE	CLASS 5.8		CLASS 8.8		CLASS 10.9		LOCKNUT CL.8 W/CL8.8 BOLT
	UNPLATED	PLATED W/ZnCr	UNPLATED	PLATED W/ZnCr	UNPLATED	PLATED W/ZnCr	
M4	15* (1.7)	19* (2.2)	23* (2.6)	30* (3.4)	33* (3.7)	42* (4.8)	16* (1.8)
M6	51* (5.8)	67* (7.6)	79* (8.9)	102* (12)	115* (13)	150* (17)	56* (6.3)
M8	124* (14)	159* (18)	195* (22)	248* (28)	274* (31)	354* (40)	133* (15)
M10	21 (28)	27 (36)	32 (43)	41 (56)	45 (61)	58 (79)	22 (30)
M12	36 (49)	46 (63)	55 (75)	72 (97)	79 (107)	102 (138)	39 (53)
M16	89 (121)	117 (158)	137 (186)	177 (240)	196 (266)	254 (344)	97 (131)
M20	175 (237)	226 (307)	277 (375)	358 (485)	383 (519)	495 (671)	195 (265)
M24	303 (411)	392 (531)	478 (648)	619 (839)	662 (897)	855 (1160)	338 (458)

NOTE: Torque values shown with * are inch pounds.

IDENTIFICATION HEX CAP SCREW AND CARRIAGE BOLTS CLASSES 5.6 AND UP



HEX NUTS AND LOCKNUTS CLASSES 05 AND UP



MINIMUM HARDWARE TIGHTENING TORQUES IN FOOT POUNDS (NEWTON-METERS) FOR NORMAL ASSEMBLY APPLICATIONS

INCH HARDWARE AND LOCKNUTS

NOMINAL SIZE	SAE GRADE 2		SAE GRADE 5		SAE GRADE 8		LOCKNUTS		NOMINAL SIZE
	UNPLATED or PLATED SILVER	PLATED W/ZnCr GOLD	UNPLATED or PLATED SILVER	PLATED W/ZnCr GOLD	UNPLATED or PLATED SILVER	PLATED W/ZnCr GOLD	GR.B w/GR5 BOLT	GR.C w/GR8 BOLT	
1/4	55* (6.2)	72* (8.1)	86* (9.7)	112* (13)	121* (14)	157* (18)	61* (6.9)	86* (9.8)	1/4
5/16	115* (13)	149* (17)	178* (20)	229* (26)	250* (28)	324* (37)	125* (14)	176* (20)	5/16
3/8	17 (23)	22 (30)	26 (35)	34 (46)	37 (50)	48 (65)	19 (26)	26 (35)	3/8
7/16	27 (37)	35 (47)	42 (57)	54 (73)	59 (80)	77 (104)	30 (41)	42 (57)	7/16
1/2	42 (57)	54 (73)	64 (87)	83 (113)	91 (123)	117 (159)	45 (61)	64 (88)	1/2
9/16	60 (81)	77 (104)	92 (125)	120 (163)	130 (176)	169 (229)	65 (88)	92 (125)	9/16
5/8	83 (112)	107 (145)	128 (174)	165 (224)	180 (244)	233 (316)	90 (122)	127 (172)	5/8
3/4	146 (198)	189 (256)	226 (306)	293 (397)	319 (432)	413 (560)	160 (217)	226 (306)	3/4
7/8	142 (193)	183 (248)	365 (495)	473 (641)	515 (698)	667 (904)	258 (350)	364 (494)	7/8
1	213 (289)	275 (373)	547 (742)	708 (960)	773 (1048)	1000 (1356)	386 (523)	545 (739)	1

NOTE: Torque values shown with * are inch pounds.

IDENTIFICATION CAP SCREWS AND CARRIAGE BOLTS



SAE GRADE 2



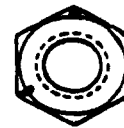
SAE GRADE 5



SAE GRADE 8



REGULAR NUTS

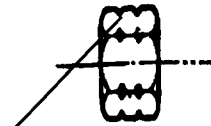


SAE GRADE 5
HEX NUTS



SAE GRADE 8
HEX NUTS

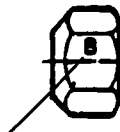
LOCKNUTS



GRADE IDENTIFICATION
GRADE A NO NOTCHES
GRADE B ONE CIRCUMFERENTIAL NOTCH
GRADE C TWO CIRCUMFERENTIAL NOTCHES



GRADE IDENTIFICATION
GRADE A NO MARKS
GRADE B THREE MARKS
GRADE C SIX MARKS
MARKS NEED NOT BE LOCATED
AT CORNERS



GRADE IDENTIFICATION

GRADE A NO MARK
GRADE B LETTER B
GRADE C LETTER C

SECTION 3

LUBRICATION AND MAINTENANCE

GENERAL INFORMATION

INTRODUCTION

This section gives full details of the service procedures necessary to maintain the tractor at peak efficiency. The lubrication and maintenance chart on page 3-7 provides a quick reference to these requirements, each operation being numbered for easy reference.

CONTENTS

The subjects covered in this section are as listed below. A full index is provided at the back of this book.

Fueling	3-2
Guard removal	3-5
Lubrication and maintenance chart	3-7
Servicing when warning lights illuminate ...	3-8
10-hour/daily service	3-14
50-hour service	3-15
300-hour service	3-22
600-hour service	3-32
1200-hour/12 month service	3-36
1200-hour/24 month service	3-40
1800-hour service	3-45
General maintenance – as required	3-47

SAFETY PRECAUTIONS

Read and observe all safety precautions listed in 'Servicing the Tractor' in the Introduction section at the front of this Manual.

NOTE: *Dispose of used filters and fluids properly.*



CAUTION: *Do not check, lubricate, service or make adjustments to the tractor with the engine running.*

DURING THE FIRST 50 HOURS OPERATION

In addition to the regular maintenance operations listed, check the following items every 10 hours or daily during the first 50 hours of operation:

- Check transmission/rear axle/hydraulics oil level
- Wheel nuts for tightness
- Front axle hub oil levels

IMPORTANT: *Park the tractor on level ground and, where applicable, extend all cylinders before checking oil levels.*

50-HOUR SERVICE

At the 50-hour service, ensure that the following additional service operations are carried out. The items are listed in the '50-Hour Service' checklist at the rear of this manual.

- Change engine oil and filter
- Change hydraulic oil filters
- Check transmission/rear axle/hydraulics oil level
- Check FWD differential oil
- Check FWD axle hub oil
- Check and adjust parking brake
- Check all air intake connections
- Inspect poly V-belt
- Tighten all cooling system hose connections.
- Check torque of front end weight clamp bolts (where equipped)
- Check torque of safety cab or frame mounting bolts
- Check torque of exhaust manifold bolts

NOTE: *Items listed in the 50-hour service are important. If not performed, early component failure and reduced tractor life may result.*

PREVENTING SYSTEM CONTAMINATION

To prevent contamination when changing oils, filters, etc., always clean the area around filler caps, level and drain plugs, dipsticks and filters prior to removal. Before connecting remote cylinders, ensure that oil contained within them is clean, has not degenerated due to long storage and is of the correct grade.

To prevent dirt entry during greasing, wipe dirt from the grease fittings before greasing. Wipe excess grease from the fitting after greasing.

FLEXIBILITY OF MAINTENANCE INTERVALS

The intervals listed in the lubrication and maintenance chart are guidelines to be used when operating in normal working conditions.

Adjust the intervals for environmental and working conditions. Intervals should be shortened under adverse (wet, muddy, sandy, extremely dusty) working conditions.

LUBRICATION AND MAINTENANCE CHART

The chart on page 6 lists the intervals when routine checks, lubrication, service and/or adjustments should be performed. Use the chart as a quick reference guide when servicing the tractor. The operations follow the chart.

FUELING THE TRACTOR



CAUTION: When handling diesel fuel, observe the following:

Do not smoke around diesel fuel. Under no circumstances should gasoline, alcohol, gasohol or dieselhol (a mixture of diesel fuel and alcohol) be added to diesel fuel because of increased fire or explosion risks. In a closed container such as a fuel tank they are more explosive than pure gasoline. Do not use these blends. Additionally, dieselhol is not approved due to possible inadequate lubrication of the fuel injection system.

Clean the filler cap area and keep it free of debris.

Fill the tank at the end of each day to reduce overnight condensation.

Never take the cap off or refuel with the engine running.

Keep control of the fuel nozzle while filling the fuel tank.

Don't fill the tank to capacity. Allow room for expansion. If the original fuel tank cap is lost, replace it with a genuine original equipment cap and tighten securely.

Wipe up spilled fuel immediately.

FUEL REQUIREMENTS

The quality of fuel used is an important factor for dependable performance and satisfactory engine life. Fuels must be clean, well-refined, and non-corrosive to fuel system parts. Be sure to use fuel of a known quality from a reputable supplier.

Use Number 2-D in temperatures above 20° F (–7° C).

Use Number 1-D in temperatures below 20° F (–7° C).

To obtain optimum combustion and minimum engine wear, the fuel selected for use should conform to the application and property requirements outlined in the following 'Diesel Fuel Selection Chart'.

DIESEL FUEL SELECTION CHART

General Fuel Classification	Final Boiling Point (max)	Cetane Rating (min)	Sulphur Content (max)
No. 1-D	550° F (288° C)	40*	0.3%
No. 2-D	675° F (357° C)	40	0.5%

NOTE: When long periods of idling or cold weather conditions below 32°F (0°C) are encountered or when continuously operating at an altitude above 5,000 ft. (1500 m) use Number 1-D fuel.

*When continually operating at low temperatures or high altitude, a minimum cetane rating of 45 is required.

Using diesel fuel with sulphur content above 0.5% requires more frequent oil changes as noted in the maintenance schedule.

The use of diesel fuel with a sulphur content above 1.3% is not recommended.

For the best fuel economy, use Number 2-D fuel whenever temperatures allow.

Do not use Number 2-D fuel at temperatures below 20° F (–7° C). The cold temperatures will cause the fuel to thicken, which may prevent the engine from running.

To be sure that a fuel meets the required properties, enlist the aid of a reputable fuel oil supplier. The responsibility for clean fuel lies with the fuel supplier as well as the fuel user.

FUEL STORAGE

Take the following precautions to ensure that stored fuel is kept free of dirt, water and other contaminants.

- Store fuel in black iron tanks, not galvanized tanks, as the zinc coating will react with the fuel and form compounds that will contaminate the injection pump and injectors.
- Install bulk storage tanks away from direct sunlight and angle them slightly so sediment in the tanks will settle away from the outlet pipe.
- To facilitate moisture and sediment removal, provide a drain plug at the lowest point at the end opposite the outlet pipe.
- If fuel is not filtered from the storage tank, put a funnel with a fine mesh screen in the fuel tank filler neck when refuelling.
- Arrange fuel purchases so summer grade fuels are not held over and used in winter.

FILLING THE FUEL TANK

1. Clean the area around the fuel cap (1) to prevent dirt from entering tank and contaminating the fuel.
2. Remove the cap and place in a clean area during refuelling.
3. Insert the fuel nozzle and hose assembly and fill the tank.
4. After filling the tank, replace and tighten the fuel cap.

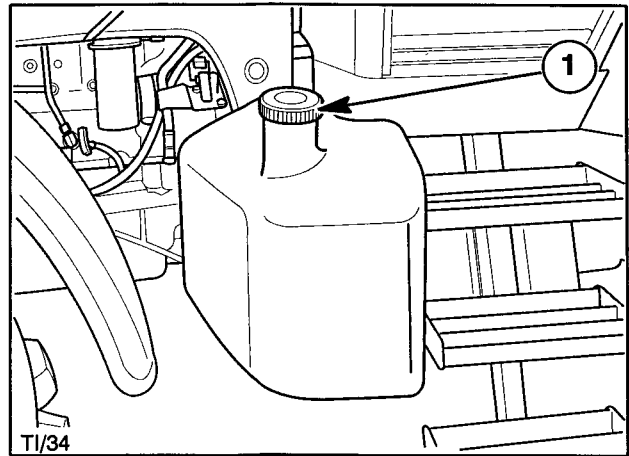
NOTE: *The right-hand tank is filled via the filler on the left-hand tank.*

IMPORTANT: *Always replace a lost or damaged cap with a genuine, original equipment replacement cap.*

Fuel tank capacity:

Left-hand tank 58 gallons (220 litres)

Right-hand tank
(if installed) 27.7 gallons (105 litres)



3-1

REMOVING GUARDS TO GAIN ACCESS TO COMPONENTS FOR INSPECTION AND MAINTENANCE

INTRODUCTION

To gain access to perform inspection, lubrication and maintenance operations, the hood and certain access panels may need to be opened or removed.

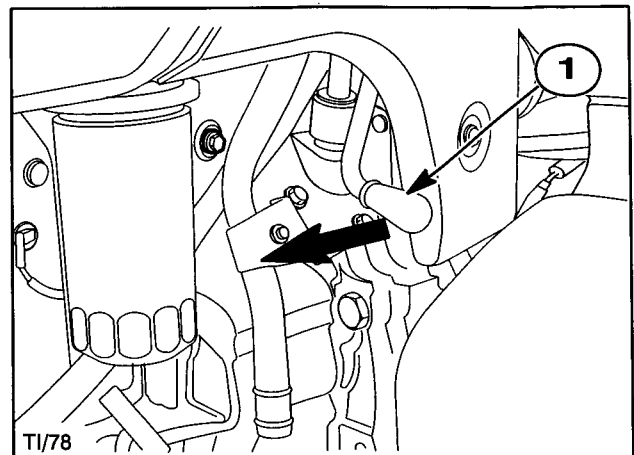
IMPORTANT: After performing work on the tractor, install all guards before operating the tractor.

IMPORTANT: Follow the guidelines listed under the heading "Servicing the Tractor" in the Safety Precautions section at the front of this manual.

HOOD

The hood is hinged at the rear to provide easy access to the engine area for routine maintenance. Two gas struts (located under the hood) assist in raising the hood.

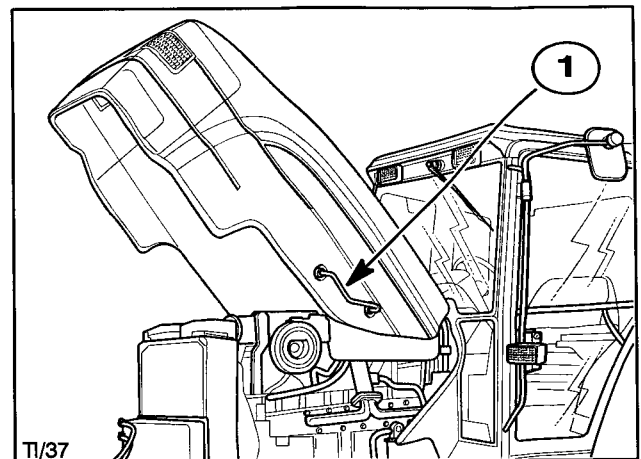
To open the hood, move the hood release lever (1), forward, allow it to return, then move it forward a second time to release the locking mechanism.



3-2

Using the handle (1), raise the hood. The gas struts will take over and raise the hood to full height, as shown.

To close the hood, pull down on the handle (1). Ensure that the hood straddles the radiator, then pull firmly down to fully close the hood. Check that the hood is properly latched by pulling up on handle.



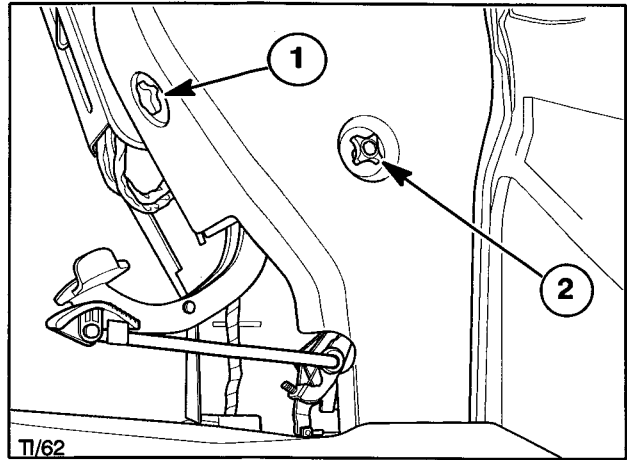
3-3

INSTRUMENT CONSOLE COVERS

The moulded panels either side of the instrument console may be easily removed for service. Remove the right-hand panel to gain access to the fuse box.

To remove, unscrew the two knobs (1) and (2) and lift out the panel.

There are only dealer serviceable components behind the left-hand panel.



3-4

LUBRICATION AND MAINTENANCE CHART

Service Interval	Operation No.	Maintenance Requirement	Check	Clean	Lube	Change	Adjust	Drain	Wash	Page No. 3-
When warning lamp lights	1	Engine air cleaner outer element . . . . .	.X	.X						8/10
	2	Engine coolant level . . . . .	.X				.X			11
	3	Brake fluid reservoir level . . . . .	.X				.X			12
	4	Clutch fluid reservoir level (where installed) . . . . .	.X				.X			12
	5	Fuel filter/water separator . . . . .	.X					.X		13
Every 10 hours or daily	6	Engine oil level . . . . .	.X				.X			14
	7	Windshield washer reservoir fluid level (where installed) . . . . .	.X				.X			14
Every 50 hours	8	Radiator, oil cooler and air conditioner condenser . . . . .	.X	.X						15
	9	Cab air filters . . . . .		.X						16
	#10	All grease fittings . . . . .			.X					17/20
	11	Tire pressures and condition . . . . .	.X				.X			21
	12	Front and rear wheel nut torque . . . . .	.X				.X			21
Every 300	*13	Engine oil and filter . . . . .				.X				22/23
	14	Battery electrolyte level (tropical climates) . . . . .	.X	.X			.X			24
	15	Front wheel drive front axle and hubs oil level . . . . .	.X				.X			24/25
	16	Hydraulic and transmission oil filters . . . . .				.X				25/26
	17	Transmission/rear axle/hydraulics oil level . . . . .	.X				.X			26
	#18	Front wheel bearings (2 wheel drive only) . . . . .			.X					27
	19	Swivel bearings (front wheel drive) . . . . .			.X					27
	#20	Rear axle shafts . . . . .			.X					28
	21	Poly V-belt . . . . .	.X							28
	22	Parking brake . . . . .	.X				.X			29
	23	Cab and safety frame (ROPS) mounting bolts torque . . . . .	.X				.X			29/30
	24	Cab air filter . . . . .							.X	30/31
Every 600 hours	25	Engine air cleaner outer element . . . . .		.X						32
	26	Engine air intake connections . . . . .	.X							32
	27	Engine valve clearance . . . . .	.X				.X			33
	28	Rocker cover ventilation filter . . . . .				.X				34
	29	Fuel filter secondary element . . . . .	.X			.X				34/35
Every 1200 hours or annually	30	Fuel filter primary element . . . . .	.X			.X				35
	31	Cab air filter . . . . .				.X				36
	32	Transmission/rear axle/hydraulic oil and filter . . . . .				.X				36
	33	FWD axle differential oil . . . . .				.X				37
	34	FWD axle hub oil . . . . .				.X				38
	35	Battery electrolyte level (temperate climates) . . . . .	.X	.X			.X			39
Every 1200 hours or two years	36	Engine coolant and filter/conditioner . . . . .				.X				40/43
	37	Engine air cleaner inner and outer elements . . . . .				.X				44
Every 1800 hours	38	Fuel injectors . . . . .	.X	.X			.X			45/47
General maintenance	39	Bleeding the fuel system . . . . .	.X				.X			47
	40	Transmission calibration (23 F x 12 R transmission) . . . . .	.X				.X			48/51
	41	Clutch fill time calibration (23 F x 12 R transmission) . . . . .	.X				.X			51
	42	Transmission calibration (18 F x 6 R transmission) . . . . .	.X				.X			52/54
	43	Calibrating the EMU . . . . .	.X				.X			55/56
	44	Footbrakes . . . . .	.X				.X			57
	45	Headlight and worklamp adjustment . . . . .	.X				.X			58
	46	Bulb replacement . . . . .				.X				59/61
	47	Fuse replacement . . . . .				.X				62
	48	Automatic pick-up hitch (non-North American) . . . . .	.X				.X			63
	49	Engine idle speed . . . . .	.X				.X			64
	50	Air Conditioner . . . . .	.X							64
	51	Tractor storage and preparation for use . . . . .	.X							65

* Oil change interval will be reduced if fuel has a high sulphur content or if the tractor is operated in extremely cold temperature.

Grease more frequently when operating in very wet, muddy or extremely dusty conditions.

WHEN THE WARNING LAMP LIGHTS

OPERATION 1

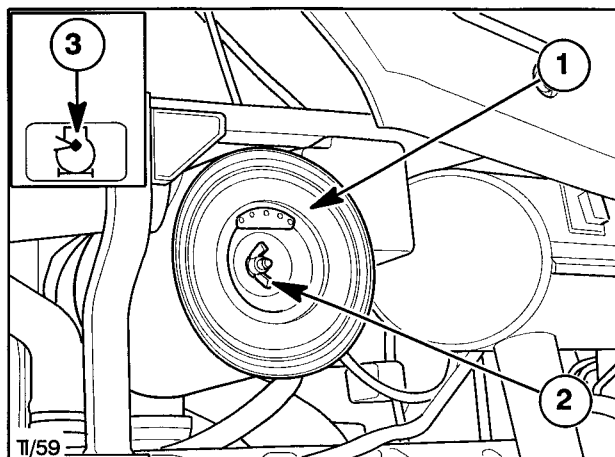
SERVICE THE ENGINE AIR CLEANER

– Figures 3-5 to 3-12

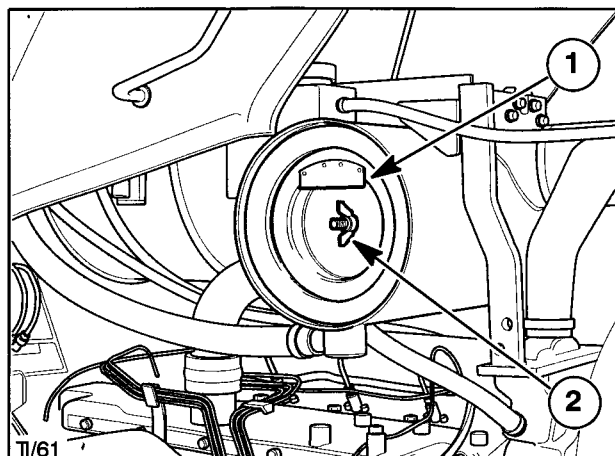
Clean the outer element when the restriction indicator light (3) on the instrument console illuminates or every 600 hours, whichever comes first. Perform the service within one hour of operation after the indicator lights up.

IMPORTANT: *Clean the outer element only when the restriction light illuminates. Cleaning the filter too frequently will decrease the service life of the filter.*

The air cleaner is accessible from the left-hand side on 8160 and 8260 models (see Figure 3-5) and from the right-hand side on 8360 and 8560 models (Figure 3-6).



3-5



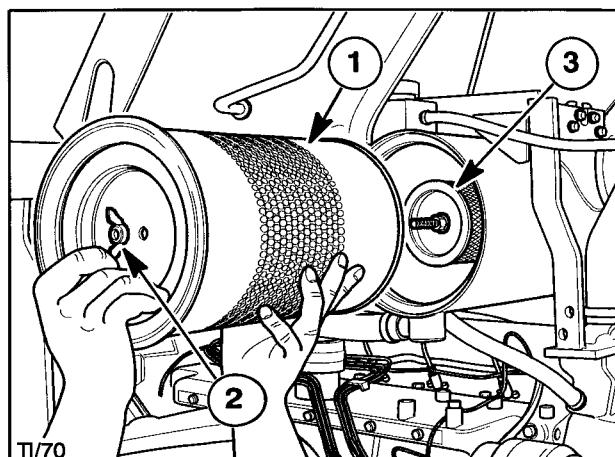
3-6

Figure 3-7 shows the outer element being removed from a 8360 or 8560 model. The removal of the element from other models is similar.

1. Unscrew the wing nut (2) and remove the outer element (1) from the air cleaner assembly.

IMPORTANT: *Do not remove or disturb the inner element (3).*

2. Examine the inside of the outer element. If dust is present, the outer element is defective and must be replaced.
3. Clean the outer element using either method A, B, or C, depending on the element's condition
Methods A or B should be used for dry dust.



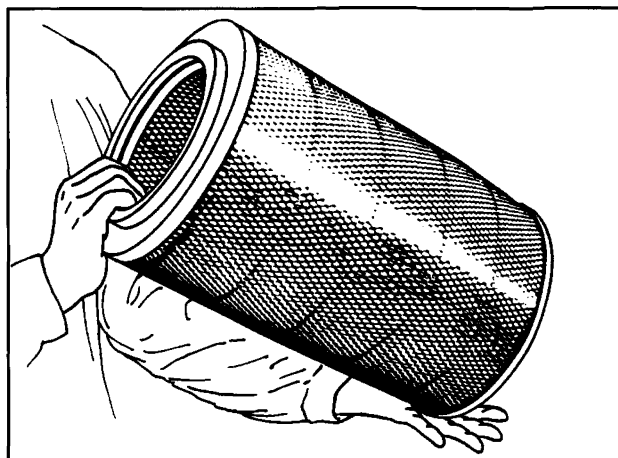
3-7

Method C should be used if the element is sooty, oily or heavily contaminated or after cleaning the element five times using methods A or B.

Method A

Lightly tap the ends of the element against the palm of the hand.

IMPORTANT: *Do not tap the element against a hard surface as this will damage the element.*



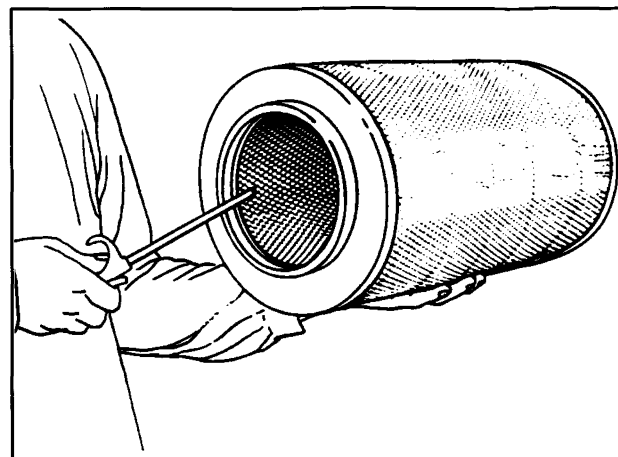
3-8

Method B

Use compressed air, not exceeding 30 PSI (2 bar). Insert the air line nozzle inside the element. Hold the nozzle 6 in. (150 mm) from the element and blow the dust from the inside through the element to the outside.



WARNING: *Wear eye protection and a face mask when carrying out this operation.*



3-9

Method C

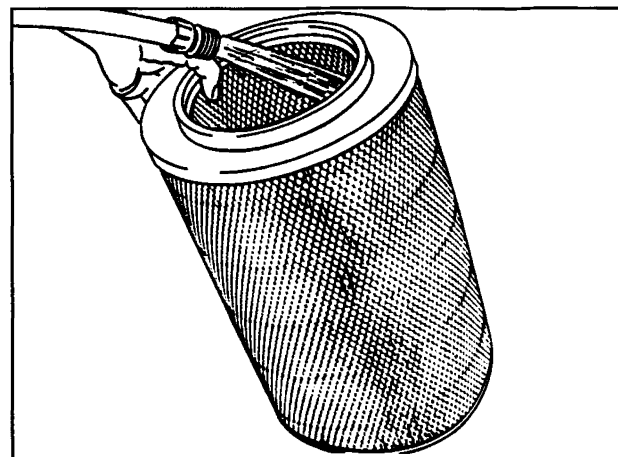
Immerse the element in warm water containing a small amount of non-sudsing detergent. Allow to soak for at least 15 minutes. Keep the open end of the element above the water line.

IMPORTANT: *Never use fuel oil, gasoline, solvent or water hotter than the hand can stand, or the filter element may be damaged.*

After soaking, agitate the element in the water, taking care not to allow dirty water outside the element to splash over to the inside.

Rinse the element with clean, running water. Rinse from the inside of the element through to the outside until the water is free of dirt. If a hose is used, do not exceed 30 PSI (2 bar). A gentle trickle of water is sufficient and will ensure that the element is not ruptured.

Shake out excess water from the element and allow to air dry naturally. Do **not** use compressed air, a light bulb or heat to dry the element.



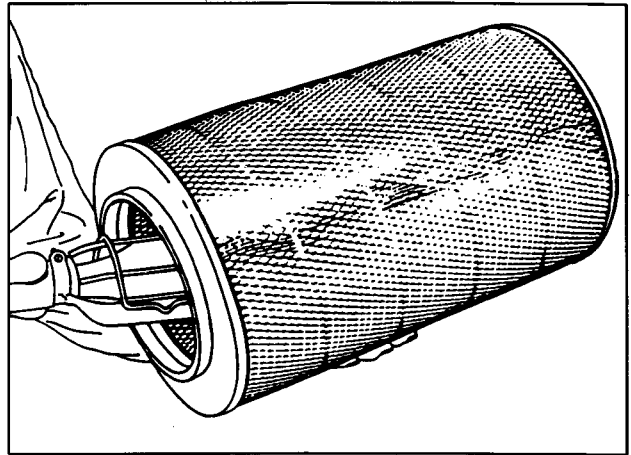
3-10

NOTE: It usually takes one to three days for a filter element to dry.

IMPORTANT: Do not attempt to dry the element with heat or compressed air and do not install until thoroughly dry as it may rupture. It is recommended that a new or previously cleaned element be installed at this service and the washed element put aside for installation at the next service. The spare element should be stored in a dry place and wrapped to prevent dust contamination or damage.

NOTE: An outer filter element may be washed once only.

4. Examine the element for damage by placing a light inside the element. Discard the element if light can be seen or if there are areas where the paper appears thin.
5. Check the element material for bunching; the metal casing for distortion and the rubber gasket for damage. Discard the filter element if it is damaged.
6. Clean the inside of the air cleaner housing using a damp, lint-free cloth on a probe. Do not damage the inner filter element. Ensure that the inner end of the housing is clean and smooth, to ensure a good seating for the rubber seal on the element.

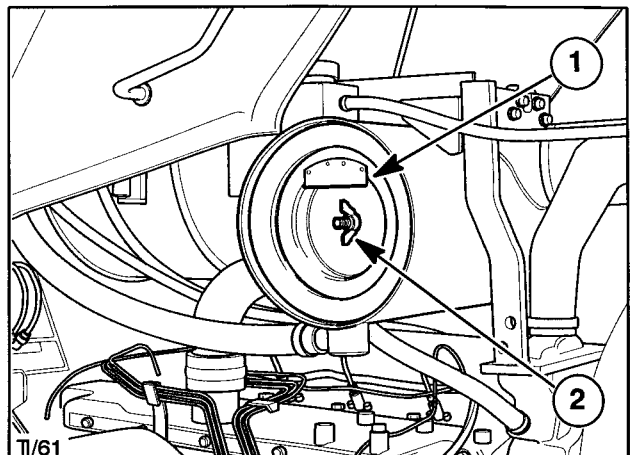


3-11

7. Install the cleaned outer element or a new outer element (1). Tighten the wing nut (2).

NOTE: Replace the wing nut seal if it is damaged.

If the restriction indicator light continues to illuminate after cleaning the element, the outer or inner element may need replacing. See operations 25 and 37.



3-12

OPERATION 2**CHECK ENGINE COOLANT LEVEL**

When the low coolant level indicator light (3) on the instrument console illuminates, stop the engine and check the coolant level.

WARNING: *The cooling system operates under pressure which is controlled by the pressure cap (4) on the coolant expansion tank. It is dangerous to remove the cap while the system is hot. When the system has cooled, use a thick cloth and turn the pressure cap slowly to allow the pressure to escape before fully removing the cap. Never remove the cap from the top of the radiator unless the expansion tank pressure cap has first been removed.*

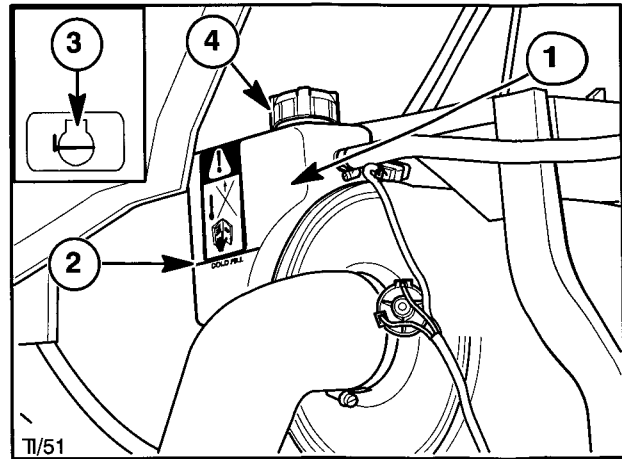
CAUTION: *Coolant should be kept off the skin. Adhere to the precautions outlined on the coolant filter and antifreeze container.*

Check the coolant level in the recovery tank (1) when the engine is cold. The coolant level should be above the bottom line (2) on the recovery tank. If coolant is required, remove the pressure cap (4) and add a 50/50 water and antifreeze mixture as specified in section 5 of this Manual.

NOTE: *If no coolant is visible in the recovery tank, the coolant level must be checked in the radiator. Check the system for leaks and repair as required.*

Remove the radiator filler cap when the system is cold. Add coolant as required to bring the level to just below the top of the filler neck. Install the cap and add coolant to the recovery tank, as described above.

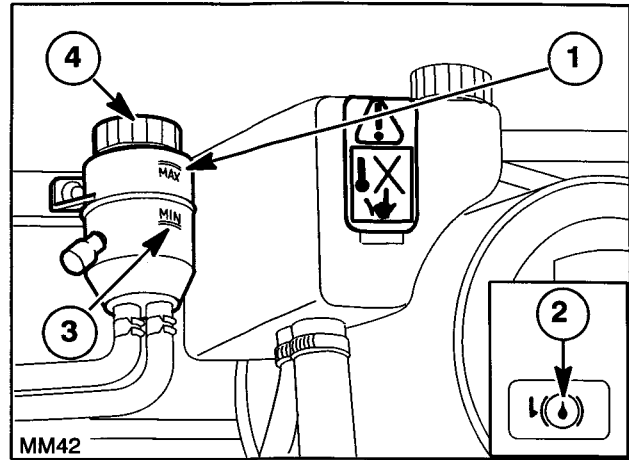
IMPORTANT: *Install a new filter/conditioner in the event of a large loss of coolant such as a failed coolant hose. See Operation 36.*

**3-13**

OPERATION 3**CHECK BRAKE OIL LEVEL**

If the indicator light (2) on the instrument panel signals low brake fluid, check the level in the reservoir.

The brake fluid reservoir is located under the the hood, on the right-hand side, behind the coolant recovery tank. Visually check the level of the fluid in the reservoir. It should **never** be allowed to fall below the 'MIN' line (3) moulded into the bottle. If necessary, remove the filler cap (4) and refill with the correct brake/clutch fluid to the 'MAX' line (1). Do not overfill.



3-14

WARNING: Use only the correct type of brake/clutch fluid. Mixing different types of fluid may cause damage to internal hydraulic braking components and result in brake failure. See section 5 for correct brake fluid specification.

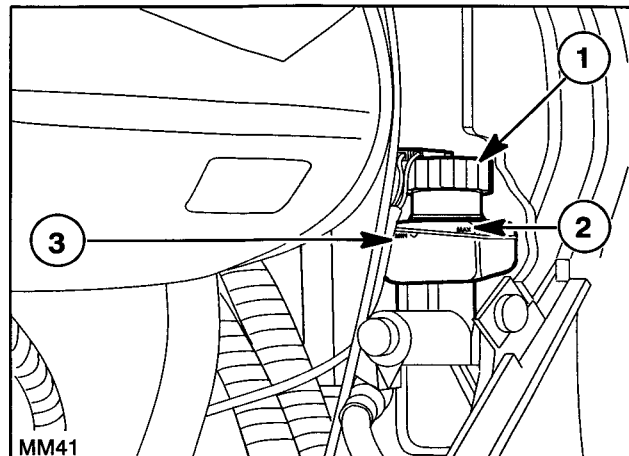
WARNING: Brake/clutch fluid should be kept off the skin. Adhere to the instructions on the brake fluid container.

IMPORTANT: Take care not to spill brake/clutch fluid on the tractor as it may damage the paint.

OPERATION 4**CHECK CLUTCH FLUID LEVEL (Not used in North America)**

If the indicator light on the instrument panel signals low clutch fluid, check the level in the reservoir.

The clutch reservoir is located under the rear of the hood on the left-hand side. Visually check the level of the fluid in the reservoir. It should not be allowed to fall below the 'MIN' line (3) moulded into the bottle. If necessary, remove the filler cap (1) and top up with the correct brake/clutch fluid to the 'MAX' line (2). Do not overfill.



3-15

WARNING: Brake/clutch fluid should be kept off the skin. Adhere to the instructions on the container. Use only the correct type of brake/clutch fluid. Mixing different types of fluid may cause damage to internal hydraulic clutch components. See section 5 for correct clutch fluid specification.

IMPORTANT: Take care not to spill brake/clutch fluid on the tractor as it may damage the paint.

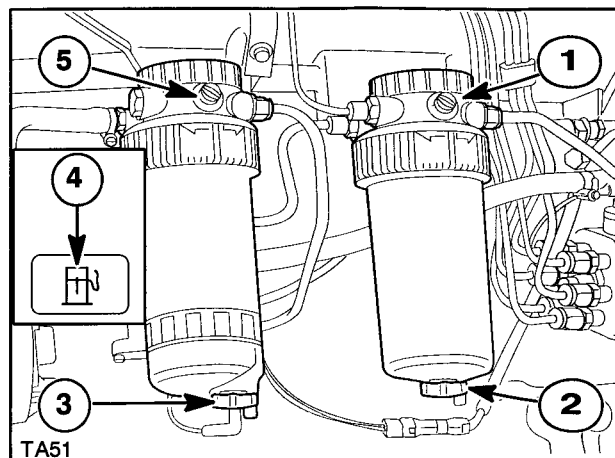
OPERATION 5**DRAIN FUEL SYSTEM WATER SEPARATOR**

IMPORTANT: Before loosening or disconnecting any part of the fuel injection system, thoroughly clean the area to be worked on to prevent contamination.

If the indicator light (4) on the instrument panel signals the presence of water in the fuel sedimenter, drain the fuel filter and sedimenter assembly, as follows:

1. Loosen the bleed screws (1) and (5) on the filter and sedimenter assemblies.
2. Open both drain plugs by loosening the knobs (2) and (3).
3. Allow contaminated fuel to drain until only clean fuel runs out. Catch the fuel in a suitable container and dispose of properly.
4. Close both drain plugs and the bleed screw (5) on the sedimenter. Bleed the filter by turning the key-start switch on to activate the electric fuel pump.

Continue until fuel, free of air bubbles is emitted from the bleed screw hole (1). Tighten the bleed screw (1) on the filter. Turn the key-start switch off.

**3-16**

EVERY 10 HOURS OF OPERATION OR DAILY (whichever occurs first)

OPERATION 6

CHECK ENGINE OIL LEVEL

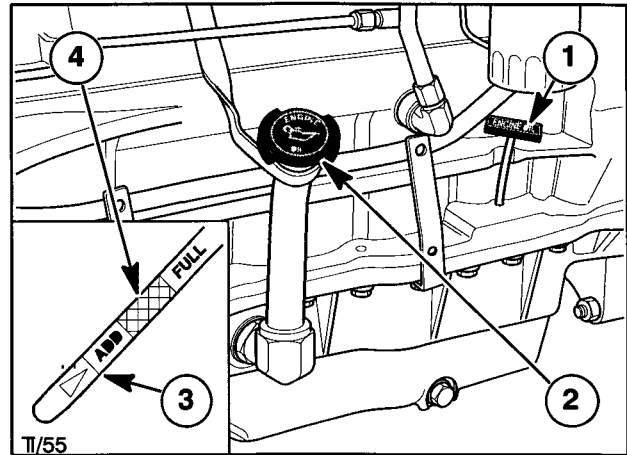
Check the oil level when the tractor is parked on a level surface and after the engine has been stopped for a minimum of five minutes.

1. Remove the dipstick (1), wipe clean and re-insert fully.
2. Pull the dipstick out again and check the oil level. The oil level should be in the cross-hatched area (4).
3. Remove the filler cap (2) and add fresh oil as required until the oil level falls within the cross-hatched area of the dipstick. The quantity of oil represented by the upper and lower lines of the hatched area is approximately 2.1 qts. (2 litres).

NOTE: Do not operate the engine with the oil level below the 'ADD' mark (3) on the dipstick.

NOTE: Do not fill above the cross-hatched area. The excessive oil will burn off and give a false impression of oil consumption.

See section 5 for the correct oil specification and viscosity.



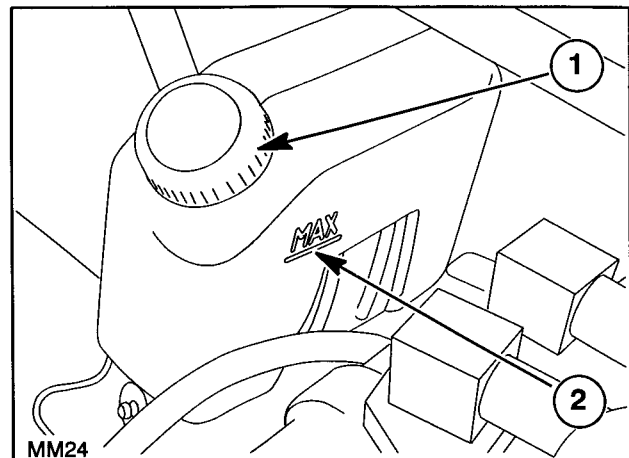
3-17

OPERATION 7

CHECK WINDSHIELD WASHER RESERVOIR (where installed)

The reservoir for the windshield washers is located beneath the rear of the cab on the left-hand side. The same reservoir is utilised for both front and rear windshield washers.

Lift off the cap (1) and fill with washer solvent solution up to MAX mark (2) on the side of the bottle. In cold weather, use a solvent with anti-freeze properties.



3-18

EVERY 50 HOURS Complete the preceding operations plus the following:**OPERATION 8****CLEAN THE RADIATOR, OIL COOLER AND AIR CONDITIONER CONDENSER CORES**

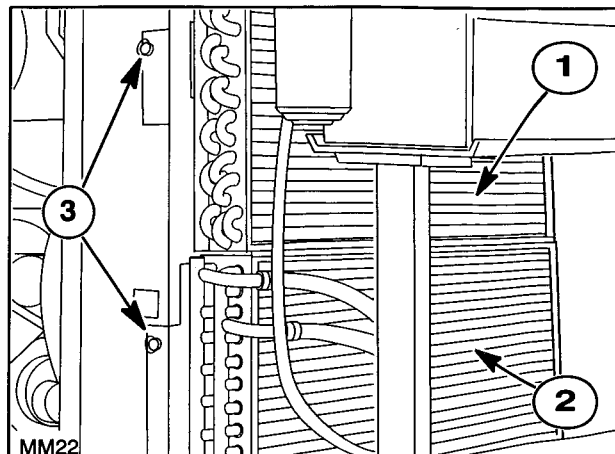
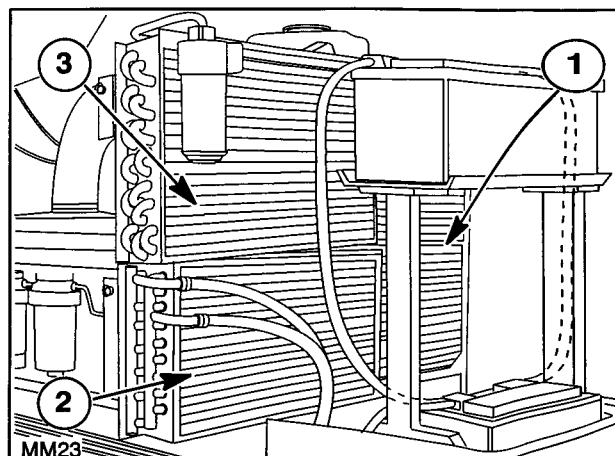
Check the cores for chaff accumulation or blockage. If any is noted, clean as follows:



CAUTION: *Wear eye protection and protective clothing during the cleaning process. Clear the area of bystanders so they are not struck by flying particles.*

1. For cleaning, use compressed air or a pressure washer not exceeding 100 PSI (7 bar).
2. The air conditioner condensor (1) and the transmission oil cooler (2) have a slide out on rails for ease of service. Turn the two quick release fasteners (3) counter-clockwise to unlock.
3. Slide the transmission oil cooler (2) and the air conditioner condensor (3) (where installed) out, as shown, to gain access to the radiator (1).
4. Direct the air or water through each core from the back to the front. Clean the radiator (1) first, then the air conditioner condensor (3) and, finally, the transmission oil cooler (2). Carefully straighten any bent fins.

NOTE: *If the cores are blocked with any oily substances, apply a detergent solution and remove it with a pressure washer.*

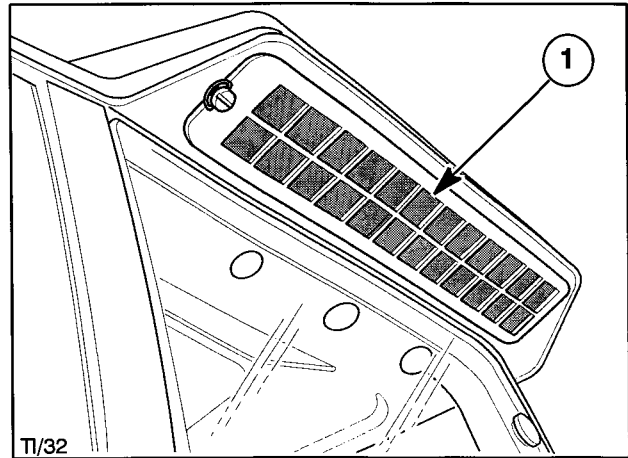
**3-19****3-20**

OPERATION 9**CLEAN THE CAB AIR FILTERS**

Air drawn into the cab by the blower fan passes through two filters, one each side of the cab roof.

Before servicing the filters, 1, switch off the blower and close the roof hatch, all windows and one door. Forcibly close the other door. The resulting back pressure will dislodge most of the loose dirt from the underside of the filters.

NOTE: *In humid conditions, such as occur on most early mornings, do **not** switch on the blower prior to servicing the filter. Damp particles drawn into the filter may be difficult to remove without washing. (See operation 24).*

**3-21**

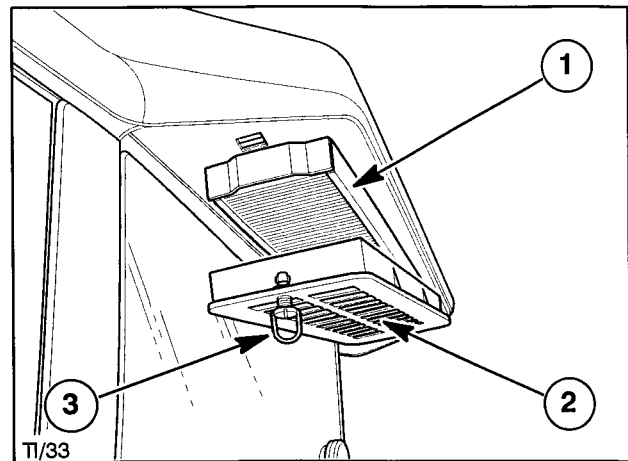
To remove a filter, turn the quick release fastener (3), $\frac{1}{2}$ turn counter-clockwise to free the front of the filter cover (2). Remove the cover (2) and filter element (1).

Clean the elements by blowing with compressed air not exceeding 30 PSI (2 bar). Blow the dust from the **upper** surface through the element to the underside. Hold the nozzle at least 12 in. (300 mm) from the element to prevent damage to the paper pleats.

NOTE: *The filters are made of specially treated paper with a rubber sealing strip bonded to the upper surface. Take care not to damage the element during removal.*

Clean both filter chambers with a damp, lint-free cloth. Replace the filter elements with the rubber seal, uppermost and re-install the covers.

NOTE: *The filters should be cleaned more frequently when operating in extremely dusty conditions.*

**3-22**

OPERATION 10**ALL GREASE FITTINGS**

Oil all pivots and apply a grease gun to the lubrication fittings, as shown in Figures 3-23 to 3-34 inclusive.

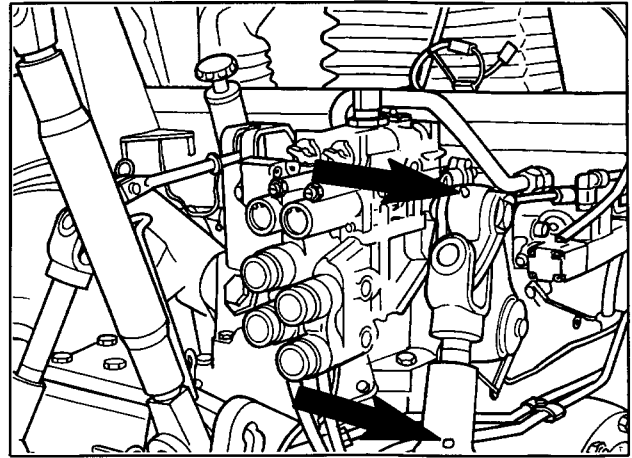
NOTE: The upper and lower swivel bearings do not require greasing at this service. See operation 19 at the 300 hour service interval.

See section 5 for the correct grease specification.

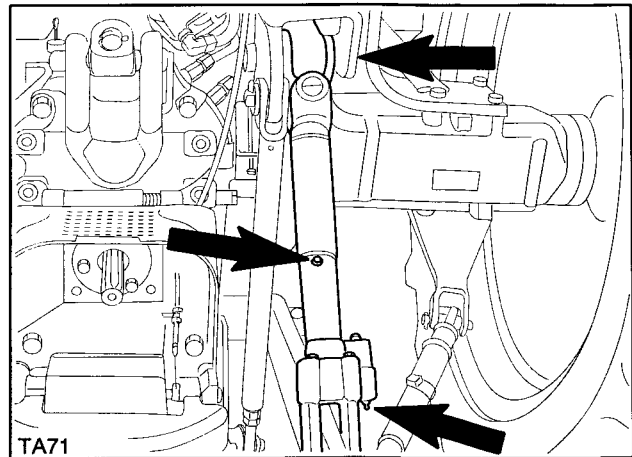
Right-hand Lift Rod (with turnbuckle adjustment)

Apply a grease gun to the lubrication fittings, as shown.

NOTE: On 8360 and 8560 models, the left-hand lift rod also has turnbuckle adjustment with similar grease fittings.

**3-23****Right-hand Lift Rod (Not used in North America)**

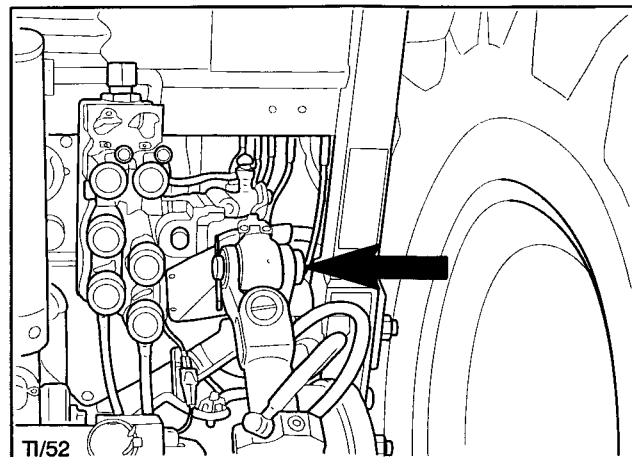
Apply a grease gun to the lubrication fittings, as shown.



TA71

3-24**Right-hand Lift Rod (Not used in North America)**

Apply a grease gun to the lubrication fitting, as shown.



TI/52

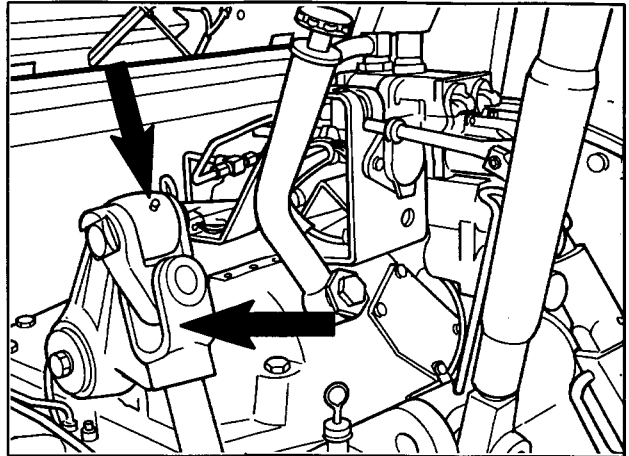
3-25

Left-hand Lift Rod

Apply a grease gun to the lubrication fitting, as shown.

Lift Assist Cylinder

Apply a grease gun to the lubrication fitting at the top end of the lift assist cylinder (8360, 8560 tractors only - not shown).

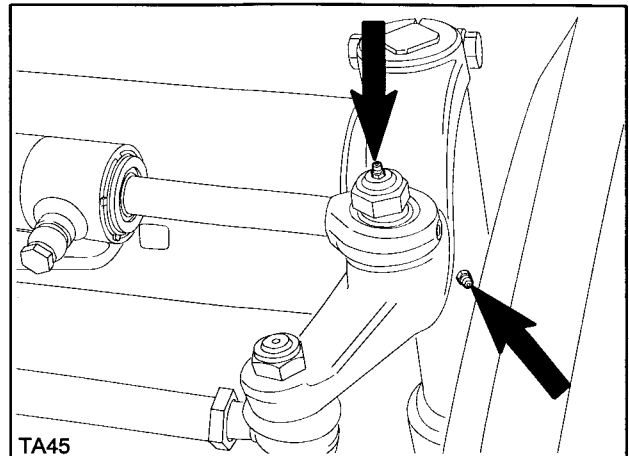


3-26

Front Wheel Spindles and Right-hand Steering arm (2WD)

Apply a grease gun to the lubrication fittings, as shown.

NOTE: *There is a grease fitting on both front wheel spindles. However, there is no grease fitting on the left-hand steering arm. This joint is sealed and lubricated for life.*

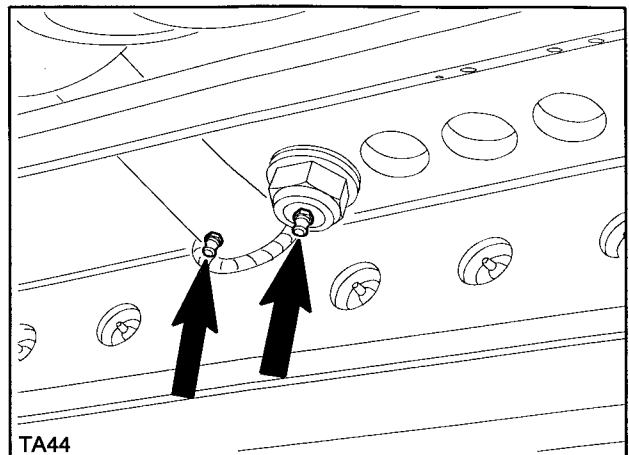


TA45

3-27

Front Trunnion Pin and Steering Cylinder (2WD)

Apply a grease gun to the lubrication fitting, as shown.

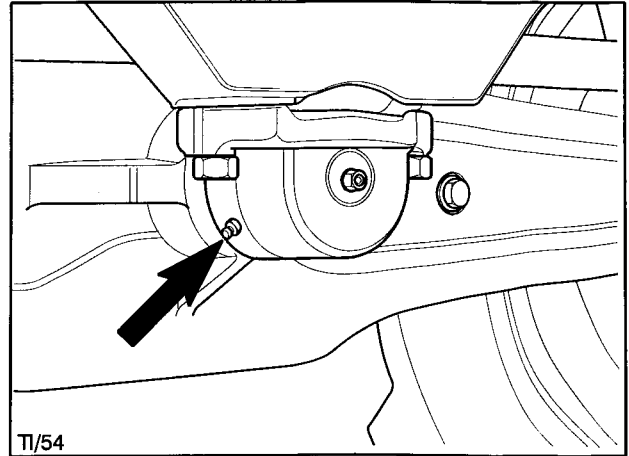


TA44

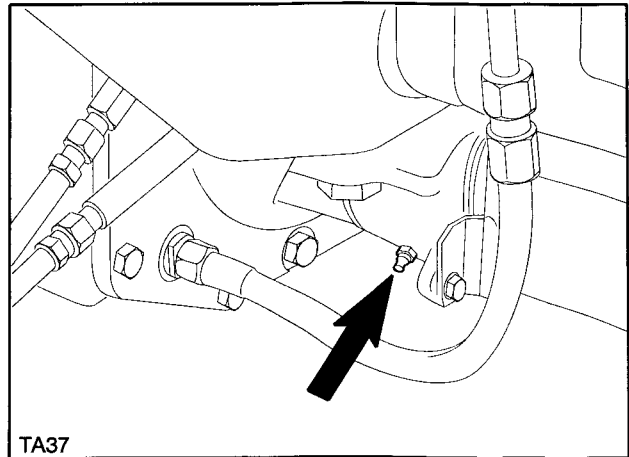
3-28

Front Trunnion Pin (FWD)

Apply a grease gun to the lubrication fitting, as shown.

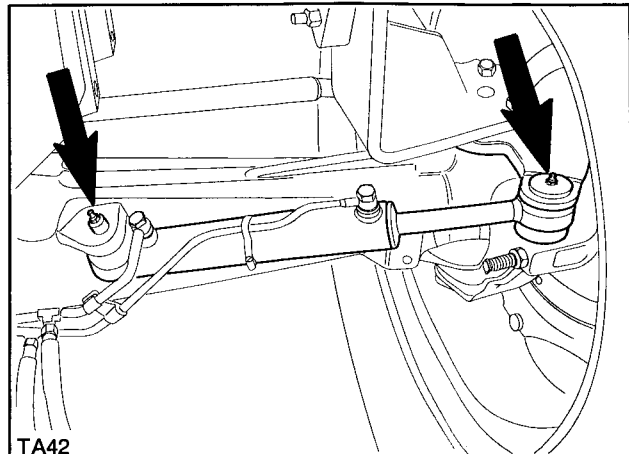
**3-29****Rear Trunnion Pin (FWD)**

Apply a grease gun to the lubrication fitting, as shown.

**3-30****Steering Cylinder (FWD)**

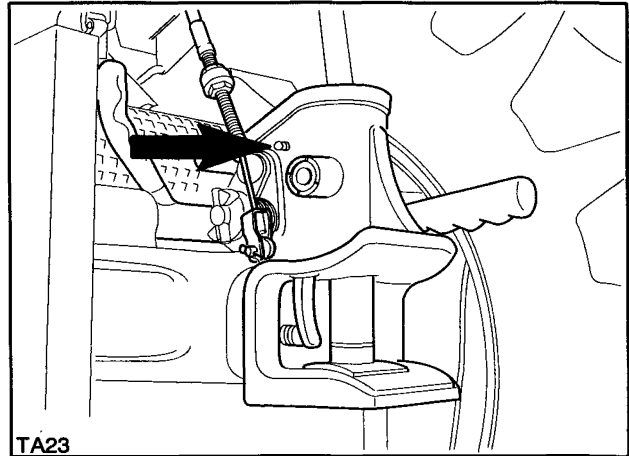
Apply a grease gun to the lubrication fittings, as shown.

NOTE: The right-hand steering cylinder is shown. There are similar grease fittings on the left-hand cylinder.

**3-31**

Rear Tow Hitch (Not used in North America)

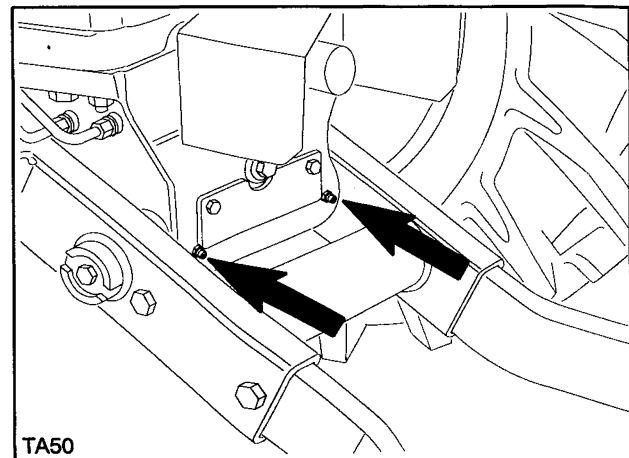
Apply a grease gun to the lubrication fitting, as shown.



3-32

Front Hitch (if equipped)

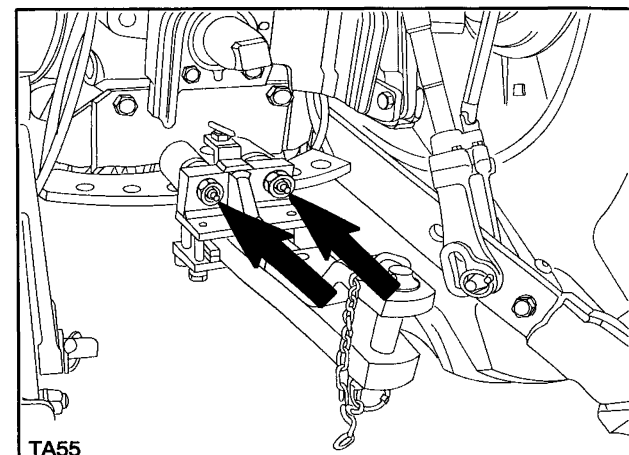
Apply a grease gun to the lubrication fittings, as shown.



3-33

Heavy Duty Roller Drawbar (if equipped)

Apply a grease gun to the lubrication fittings, as shown.



3-34

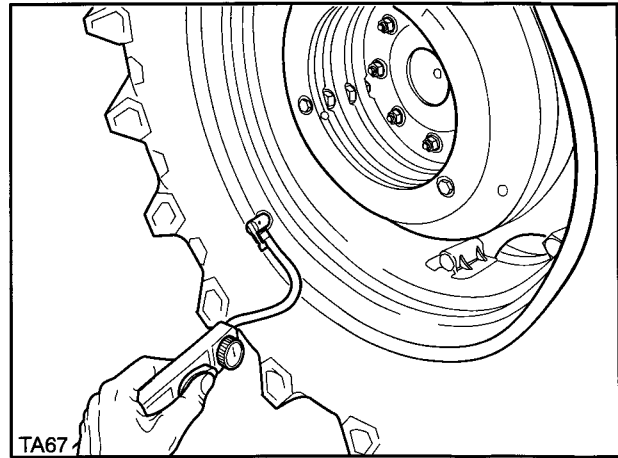
OPERATION 11

CHECK TIRE PRESSURES AND TIRE CONDITION

Check and adjust the front and rear tire pressures. Inspect the tread and sidewalls for damage.

Adjust the tire pressures to suit the load being carried. See 'Tire Pressures and Permissible Loads' in Section 2.

NOTE: If the tires are ballasted with a calcium chloride/water solution, use a special tire gauge as the solution will corrode a standard-type gauge. Check pressure with the valve stem at the bottom.



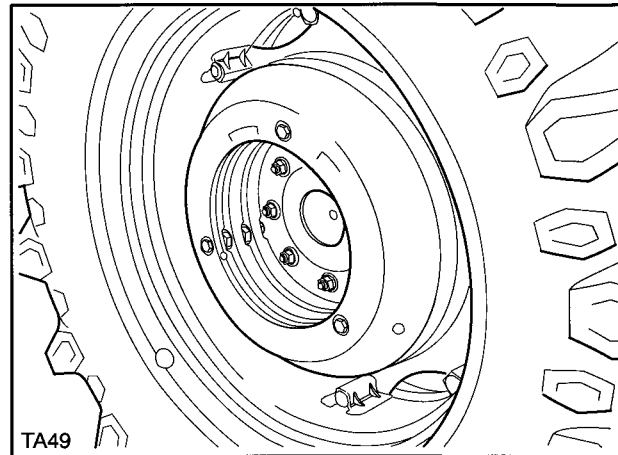
3-35

OPERATION 12

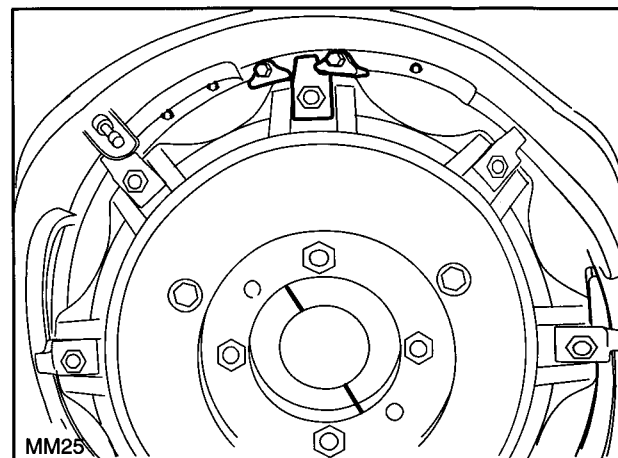
CHECK FRONT AND REAR WHEEL NUTS

Check the front and rear wheel nuts for tightness using a torque wrench (with a torque multiplier, where necessary). A manual adjust wheel is shown in Figure 3-36 and a power adjust wheel in Figure 3-37. The specified torque figures are shown in the following table:

Two wheel drive –	
Front disc to hub bolts	230 lbf.ft (314 Nm)
Front wheel drive – Manual adjust front wheels	
Front disc to hub nuts	156 lbf. ft (211 Nm)
Front disc to rim nuts	177 lbf. ft (240 Nm)
Manual adjust rear wheels	
Disc to hub nuts	188 lbf. ft (255 Nm)
Disc to rim nuts (34 in. rims)	177 lbf. ft (240 Nm)
Disc to rim nuts (38 in. rims)	207 lbf. ft (280 Nm)
Power adjust rear wheels	
Disc to hub nuts	180 lbf. ft (254 Nm)
Disc to rim clamp nuts	180 lbf. ft (245 Nm)
Bar axle	
Wedge retaining bolts	216 lbf. ft (294 Nm)



3-36



3-37

ENGINE OIL CHANGE PERIOD

IMPORTANT: Operation 13 depicts the normal 300 hour engine oil and filter change period.

Cold Temperature Operation

Engines operating in temperatures below -12°C (10°F) or in severe conditions should have the oil changed every 150 hours of operation. (The oil filter need only be changed at the normal 300 hour service interval).

Diesel Fuel Sulphur Content

In some areas, locally available diesel may have a high sulphur content, in which case the oil change period should be adjusted, as follows:

- Sulphur content between 0.5 and 1.0%
– change engine oil every 150 hours.
- Sulphur content between 1.0 and 1.3%
– change engine oil every 75 hours.

If in doubt, follow the engine oil change recommendations on the decal affixed to the underside of the hood.

Rape Seed Oil Based Fuel (RME)

When RME fuel is used, change the engine oil and filter every 150 hours.

EVERY 300 HOURS carry out the preceding checks plus the following:

OPERATION 13

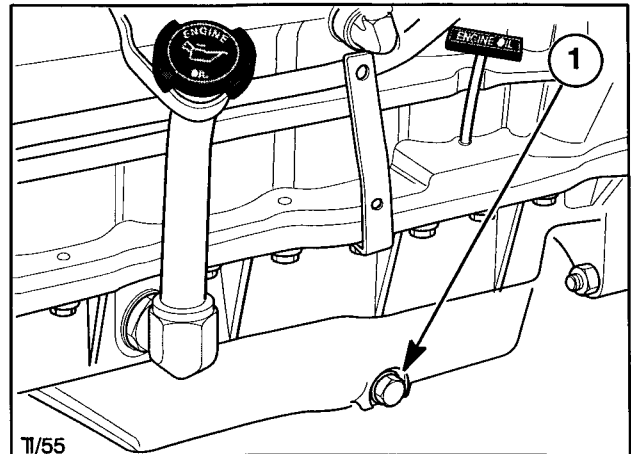
ENGINE OIL AND FILTER

Run the engine until it is warm before changing the oil and filter. Park the tractor on level ground and stop the engine. Engage the parking brake.

WARNING: Be very careful to avoid contact with hot engine oil. If the engine oil is extremely hot, allow it to cool to a moderately warm temperature before proceeding.

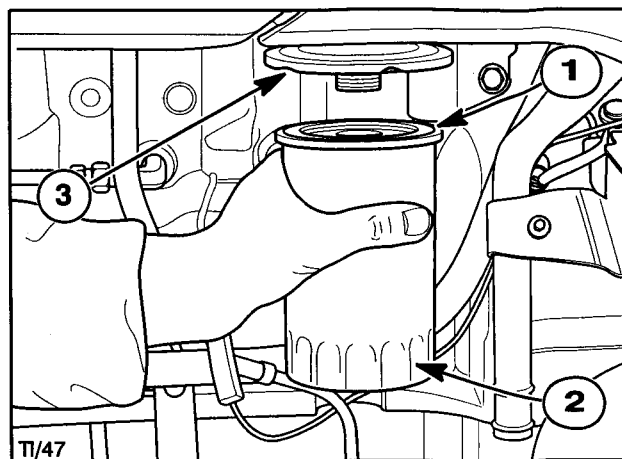
To change the oil and filter:

1. Remove the engine oil drain plug (1), and catch the oil in a suitable container. Dispose of the oil properly.
2. Replace the drain plug after oil has drained.



3-38

3. Clean the oil filter area. Unscrew the oil filter (2) and discard.
4. Clean the filter mounting surface (3).
5. Apply a thin film of clean oil on the new oil filter sealing ring (1) and install the filter. Turn until the sealing ring contacts the mounting surface, then tighten an additional $\frac{3}{4}$ to 1 full turn. Do not overtighten.



3-39

6. Remove the filler cap (2) and fill with approximately 20 qts. (19 litres) of fresh oil of the correct grade and viscosity.
7. Start and run the engine at idle speed for 3 minutes, then stop the engine.

NOTE: Make sure that the engine oil pressure gauge or bar graph enters the operating area at start up. If it doesn't, stop the engine and investigate the cause.

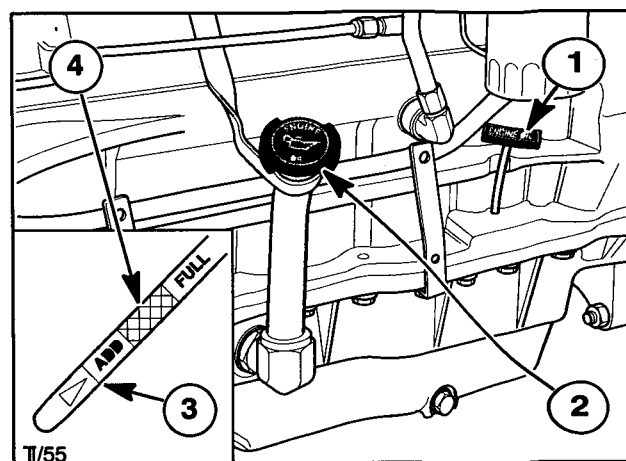
8. Check the drain plug and oil filter areas for leaks.
9. Wait 5 minutes to allow the oil to drain into the crankcase, then check the oil level on the dipstick (1). The oil level should be within the cross-hatched area (4). Add more oil, as required.

NOTE: Do not fill above the upper line of the cross-hatched area. Excessive oil will be burned off within a short time and give a false impression of oil consumption.

NOTE: Do not operate the engine with the oil level below the bottom mark (3) on the dipstick.

See section 5 for the correct oil specification.

Oil Capacity (Including filter): 20 qts.
19 litres



3-40

OPERATION 14**BATTERIES**

IMPORTANT: *This operation applies only to batteries on tractors operating in **tropical** climates. Tractors operating in temperate climates should have the battery electrolyte level checked every 1200 hours or 12 months. See operation NO TAG.*

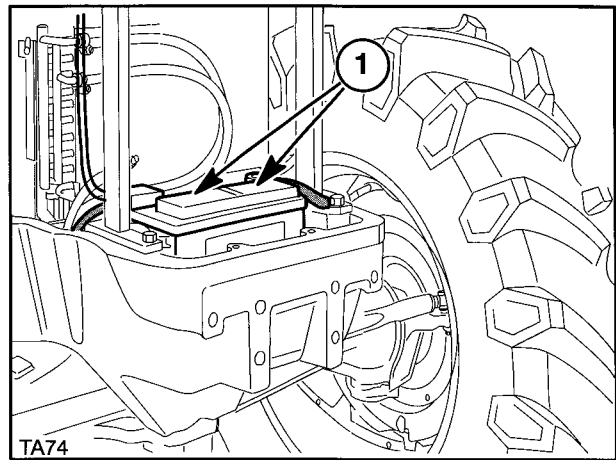
Use a screwdriver to pry the covers (1) from the top of the batteries and expose the vent holes. Using a pencil or similar shaped piece of wood as a dipstick, check that the electrolyte level is 0.65 in. (17 mm) above the top of the separator plates in each cell.

IMPORTANT: *Do not use a metal probe to check the electrolyte level.*

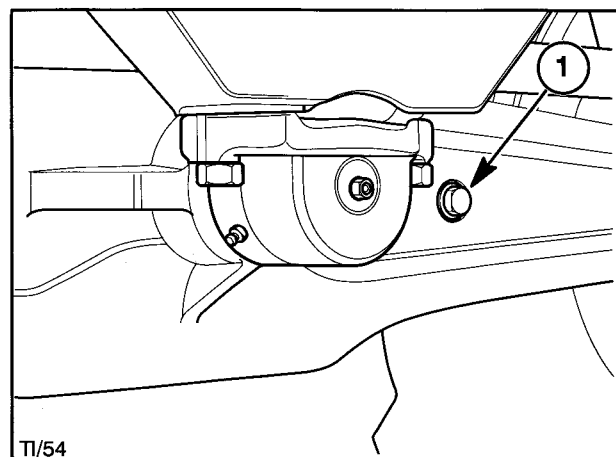
If necessary, refill with distilled water until the level is correct. Do not overfill. Never use tap water, rain water or other source.

To prevent the formation of corrosion the terminals should be cleaned and lightly coated with petroleum jelly.

IMPORTANT: *In the event of the batteries being severely discharged, such that terminal voltage is below 7 volts, recovery will require a special charging procedure. See your authorized dealer.*

**3-41****OPERATION 15****FRONT WHEEL DRIVE LUBRICATION****Front Axle**

Remove the combined level/filler plug (1) and ensure that the oil reaches the bottom of the opening. If necessary, refill through the opening with clean oil and replace the plug.

**3-42**

Front Hub

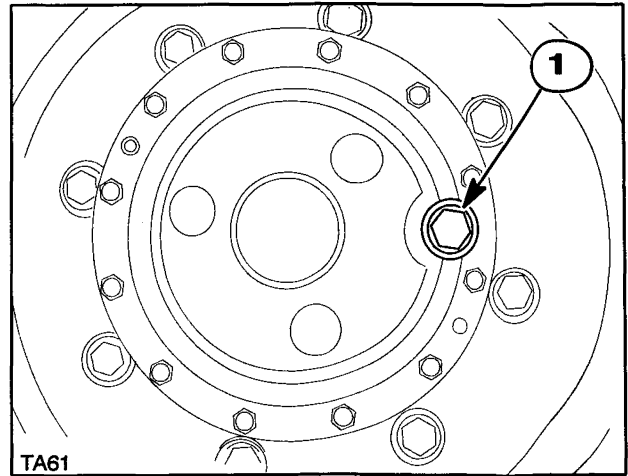
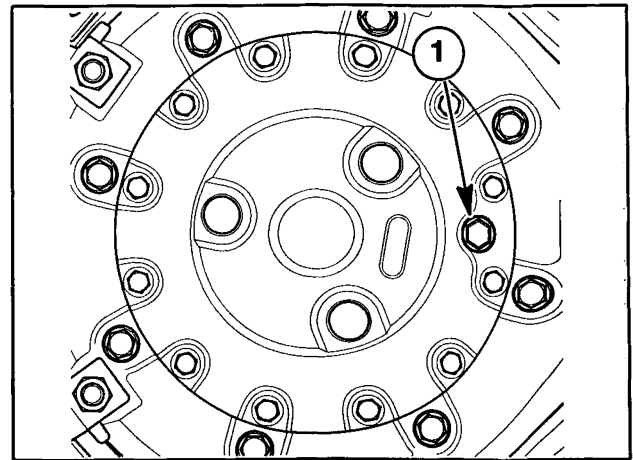
Position a front wheel with the combined level/filler plug (1) at the 3 o'clock position, as shown.

NOTE: The hubs on 8160 and 8260 tractors (Figure 3-43) are different in size and appearance to those on 8360 and 8560 models (Figure 3-44).

Remove the level/filler plug and ensure that the oil reaches the bottom of the opening. If necessary, refill through the opening with clean oil until oil just overflows from the opening. Re-install the plug.

Repeat on the other front wheel.

See section 5 for the correct oil specification.

**3-43****3-44**

OPERATION 16**CHANGE HYDRAULIC AND TRANSMISSION OIL FILTERS**

All the filters are installed under the right-hand side of the platform.

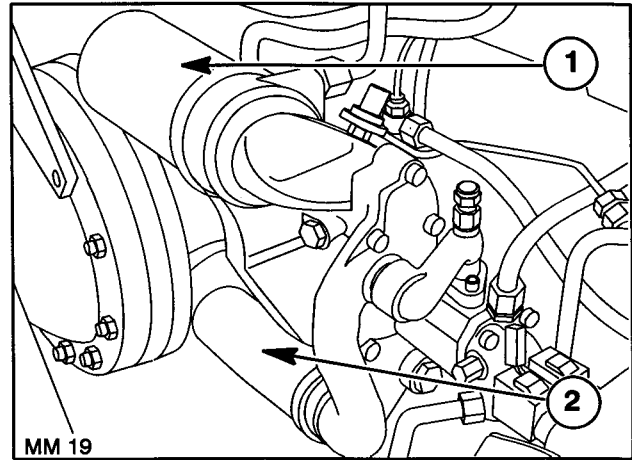
The main filter (1) and the charge filter (2) are installed as shown on tractors with variable displacement pump (CCLS system).

All filters are of the disposable type. To change a disposable filter, clean the area around the filter, then unscrew and discard it.

NOTE: 'Crack' open the main filter (1) and allow to stand for a few moments before removing fully. This will allow air into the filter so that most of the oil can drain back into the hydraulic system.

Clean the inlet channel and the face of the filter mounting. Smear clean oil around the rubber seal of each new filter and install on the tractor.

Thread the filter on until the faces just meet, then tighten a further $\frac{3}{4}$ of a turn. Do not overtighten.



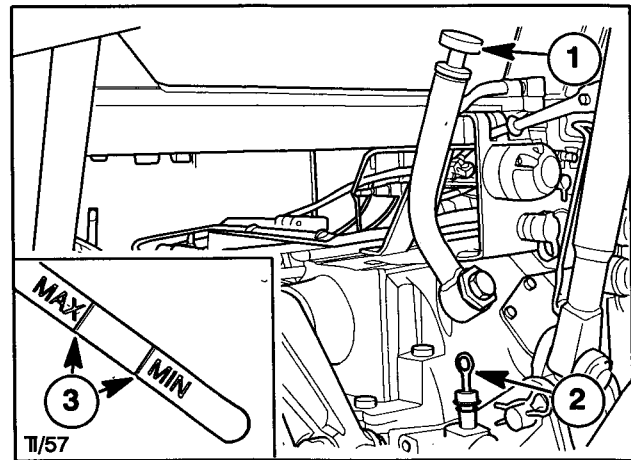
3-45

OPERATION 17**CHECK TRANSMISSION, REAR AXLE, HYDRAULICS OIL LEVEL**

Check the oil level with the tractor parked on a level surface, with all cylinders extended and the engine shut off for at least five minutes.

Remove the dipstick (2) and check that the oil level is between the 'MIN' and 'MAX' marks (3). If the oil level is low, remove the filler plug or cap (1) and add oil, as required.

See section 5 for the correct oil specification.



3-46

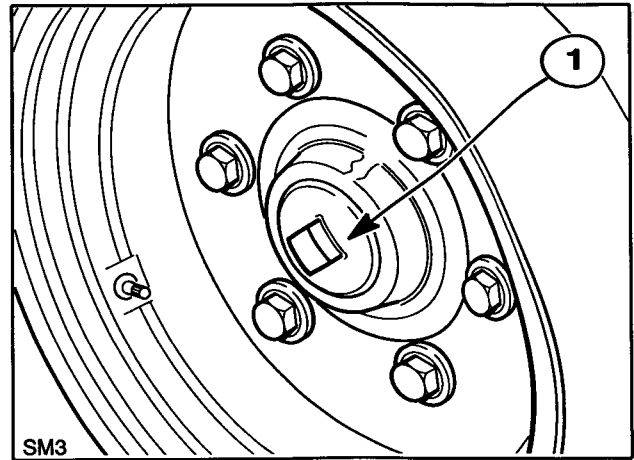
OPERATION 18**GREASE THE FRONT WHEEL BEARINGS
(2 wheel drive only)**

Remove the center cap (1). Pack the cap with fresh grease and re-install.

Repeat on the opposite wheel.

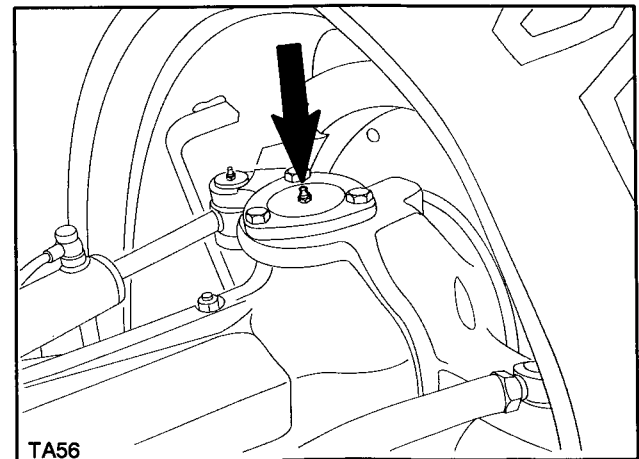
NOTE: Grease more frequently when operating in very wet, muddy or extremely dusty conditions.

See section 5 for the correct grease specification.

**3-47****OPERATION 19****GREASE THE SWIVEL BEARINGS (front
wheel drive only)****Upper Swivel Bearings**

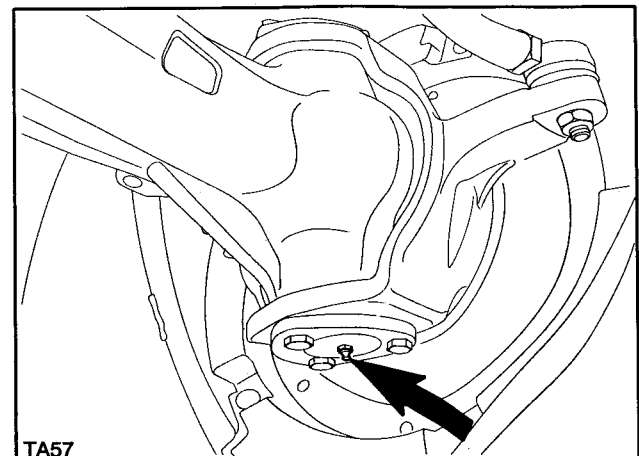
Apply a grease gun to the lubrication fitting, as shown.

NOTE: The left-hand swivel bearing is shown. There is a similar grease fitting on the right-hand swivel bearing.

**3-48****Lower Swivel Bearings**

Apply a grease gun to the lubrication fitting, as shown.

NOTE: The left-hand swivel bearing is shown. There is a similar grease fitting on the right-hand swivel bearing.

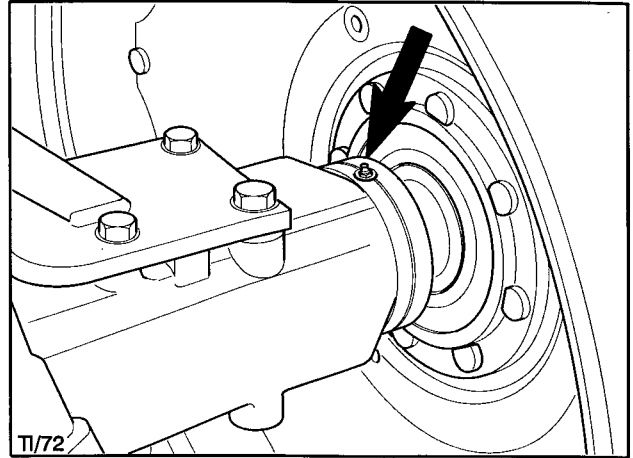
**3-49**

OPERATION 20**GREASE THE REAR AXLE SHAFTS**

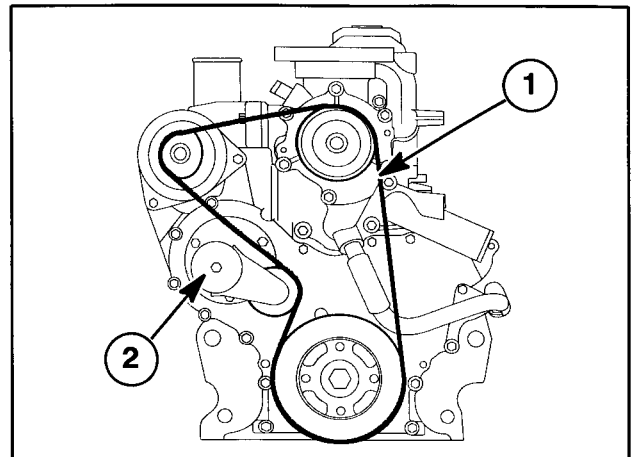
Apply two strokes only of the grease gun to the grease fitting installed at both ends of the axle shaft.

NOTE: Grease more frequently when operating in very wet, muddy or extremely dusty conditions.

See section 5 for the correct grease specification.

**3-50****OPERATION 21****INSPECT POLY V-BELT**

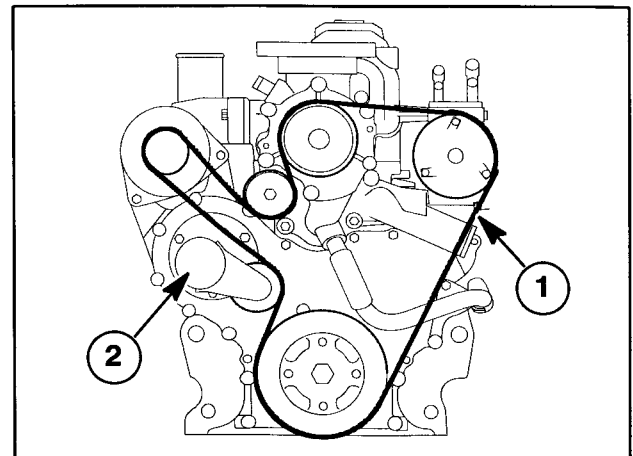
The Poly V-belt (1) is shown on a tractor without air conditioner.

**3-51**

The belt (1) shown is on a tractor with air conditioner.

Inspect the belt over its entire length, checking for chafing, cracking, cuts and general wear. If in doubt, install a new belt.

Ensure that the belt is correctly located on the pulleys and check that the belt tensioner (2) is operating correctly.

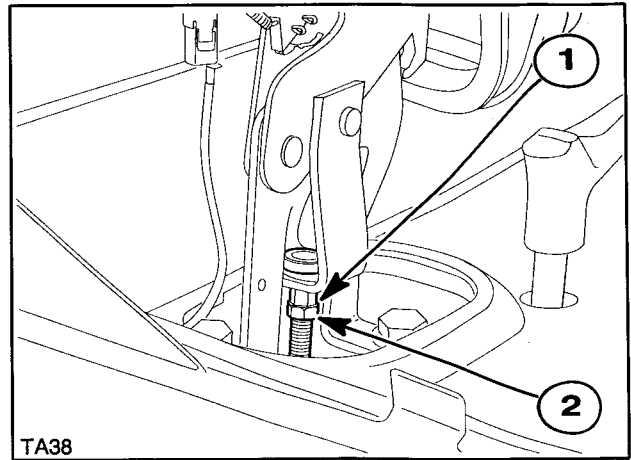
**3-52**

OPERATION 22**ADJUST PARKING BRAKE**

Apply the parking brake so that the 4th. notch (from the bottom) of the sector is engaged. Loosen the locknut (2) and tighten the adjuster nut (1) on the operating cable. Engage the parking brake into the 5th notch. Loosen adjustment if too tight.

Release the parking brake and ensure that the tractor rolls freely. Apply the handbrake to ensure that the system operates freely. Tighten the locknut.

Road test, using the parking brake to stop the tractor.

**3-53****OPERATION 23****CHECK SAFETY CAB AND ROPS MOUNTING BOLTS**

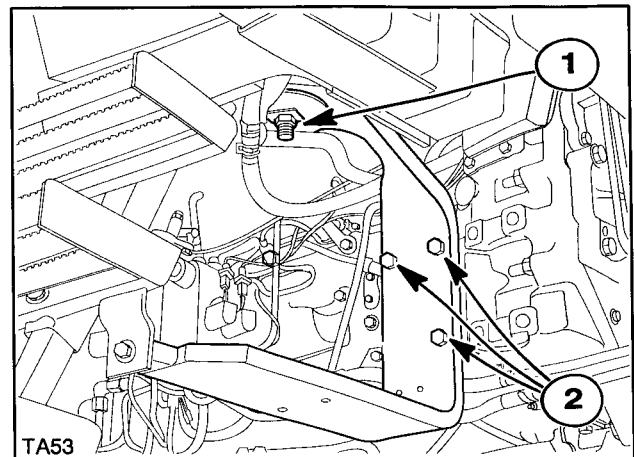
Check the torque of the safety cab or ROPS mounting bolts:

Cab or Platform Front Mounting Bolts and Nuts (all models)

The front mounting nuts are accessible from beneath the cab/platform and are located on both sides, at the front. Torque the nuts/bolts as follows:

Mounting bracket nuts (1): 250–310 lbf. ft.
(340–420 Nm)

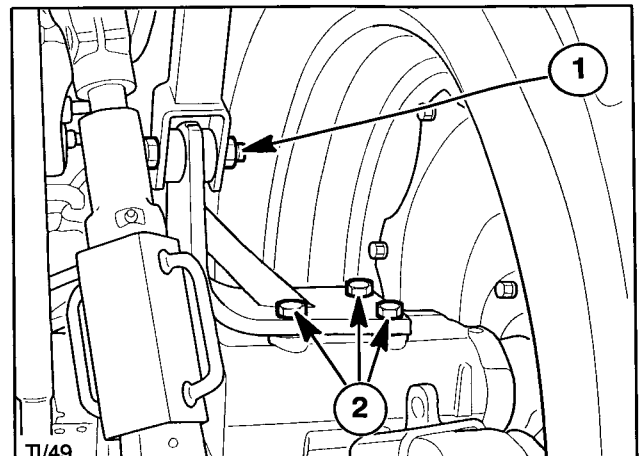
Mounting bracket to
transmission bolts (2): 84–107 lbf. ft.
(114–146 Nm)

**3-54****Cab Rear Mounting Bolts and Nuts (8160, 8260 and 8360 models)**

The rear mounts are accessible from beneath the cab and are located on both sides, at the rear. Torque the nuts/bolts as follows:

Mounting bracket nuts (1): 250–316 lbf. ft.
(340–420 Nm)

Mounting bracket to
rear axle bolts (2): 184–227 lbf. ft.
(250–309 Nm)

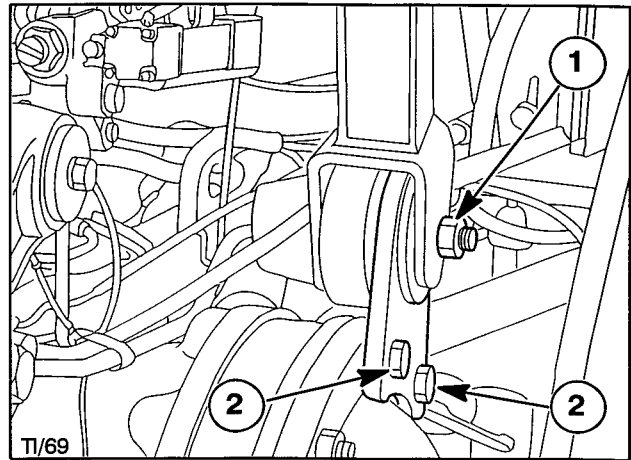
**3-55**

Cab Rear Mounting Bolts and Nuts (8560 model)

The rear mounts are accessible from beneath the cab and are located on both sides, at the rear. Torque the nuts/bolts as follows:

Mounting bracket nuts (1): 250–310 lbf. ft.
(340–420 Nm)

Mounting bracket to rear axle bolts (2): 184–227 lbf. ft.
(250–309 Nm)

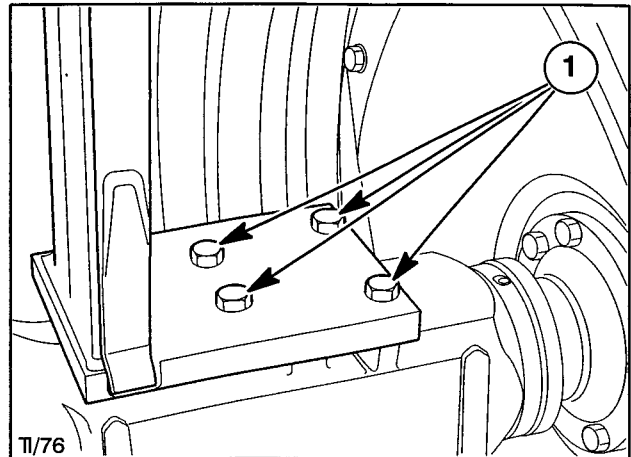


3-56

Platform Rear Mounting (ROPS) Bolts (8160, 8260 and 8360 models less cab)

The rear mounts are accessible from beneath the cab/platform and are located on both sides, at the rear. Torque the nuts/bolts as follows:

Mounting bracket to rear axle bolts (1): 236–295 lbf. ft.
(320–400 Nm)



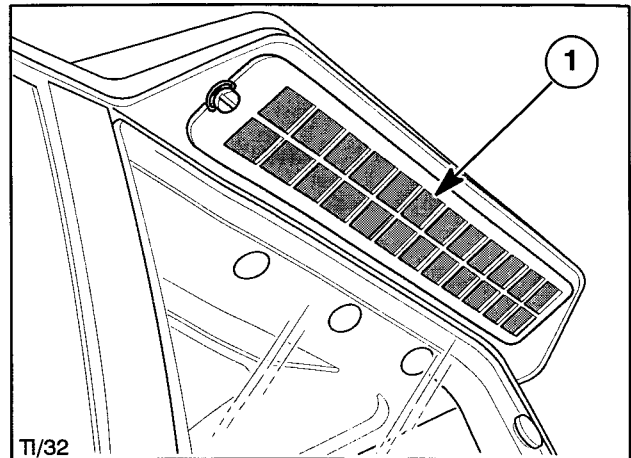
3-57

OPERATION 24**WASH THE CAB AIR FILTERS**

Before servicing the filters, switch off the blower and close all windows, the roof hatch and one door. Slam the other door closed. The resulting back pressure will dislodge most of the loose dirt from the underside of the filters.

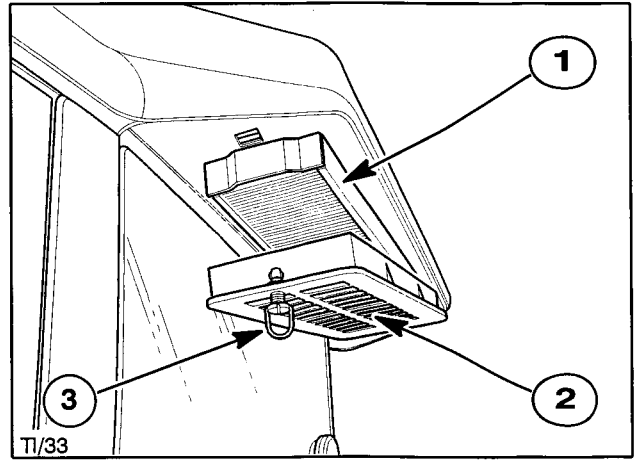
NOTE: In humid conditions, such as occur on most early mornings, do not switch on the blower prior to servicing the filters.

NOTE: The filters (1), are located either side of the roof. They are made of specially treated paper with a rubber sealing strip bonded to the upper surface. Do not damage the element during removal.



3-58

1. To remove a filter, turn the quick release fastener (3), $\frac{1}{2}$ turn anti-clockwise to free the front of the filter cover (2). Remove the cover (2) and filter element (1).
2. Dry clean the filter element, as described in operation 9.
3. After dry cleaning, soak the filter for 15 minutes in warm water containing a small amount of mild detergent. The side of the filter with the sealing strip should remain above the surface of the water.
4. Rinse the filter with running water below 30 PSI (2 bar). Direct the water through the filter in the opposite direction to the normal air flow.
5. Shake off the excess water. Position the filter with the seal side up and allow to dry naturally.



3-59

IMPORTANT: Do not attempt to dry the filter with heat or compressed air and do not install until thoroughly dry as the filter may rupture. It is recommended that a new filter be installed at this service and the washed filter put aside for installation at a subsequent service. Store the spare filter in a dry place and wrap it to prevent dust contamination or damage.

6. Clean the filter chamber with a damp, lint-free cloth.
7. Replace the filter elements with the rubber seal uppermost and re-install the covers.

NOTE: Wash the filter more frequently when operating in extremely dusty conditions.

IMPORTANT: Replace the filter if pinholes can be seen when the filter is held up to a strong light, when the filter is dark and dirty appearing after washing, when the metal housing is bent or when the seal is damaged.



WARNING: The cab air filters are designed to remove dust from the air but will not exclude chemical vapour. Follow the chemical manufacturers' directions regarding protection from dangerous chemicals.

EVERY 600 HOURS carry out the preceding checks plus the following:

OPERATION 25

CLEAN ENGINE AIR CLEANER OUTER ELEMENT

Clean the engine air cleaner outer element as detailed in operation 1.

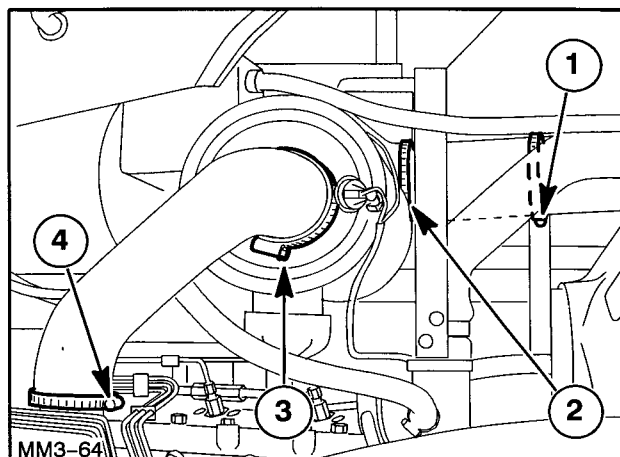
OPERATION 26

CHECK ENGINE AIR INTAKE CONNECTIONS

– Figures 3-60 to 3-62

8160 and 8260 models

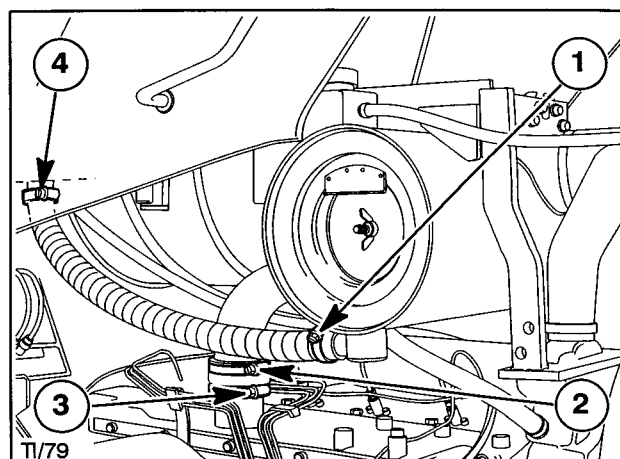
Working from both sides of the engine, as necessary, check all intake system connections at points (1), (2), (3) and (4) for proper sealing and the hose clamps for tightness. It is essential that the clean side of the filtration system is sealing correctly at the connections (3) and (4).



3-60

8360 and 8560 models

From the right-hand side of the engine, check the exhaust aspirator connections at points (1) and (4) and the two hose clamps (2) and (3) on the turbocharger to intake manifold connection for proper sealing and the clamps for tightness.

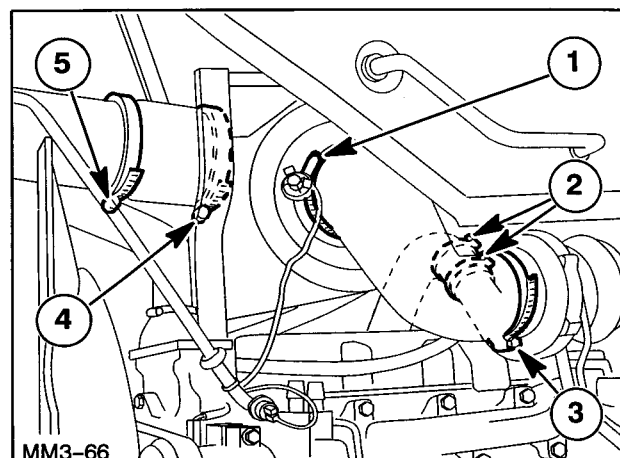


3-61

8360 and 8560 models

From the left-hand side of the engine, check the air cleaner intake connections at points (4) and (5) and the air cleaner to turbocharger connections at points (1) and (3). It is essential that the clean side of the filtration system is sealing correctly at the connections (1) and (3).

There are also two hose clamps, 2, on the turbocharger to intake manifold tube.



3-62

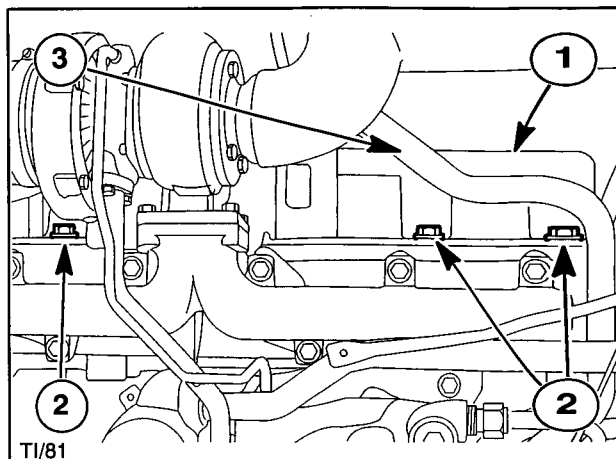
OPERATION 27**CHECK ENGINE VALVE CLEARANCE**

Check the valve clearance with the engine cold.

The correct valve clearance is:

Inlet	0.014 - 0.018 in. (0.36 - 0.46 mm)
Exhaust	0.017 - 0.021 in. (0.43 - 0.53 mm)

Remove the rocker cover ventilation tube (3), which is fastened to the left-hand side of the block by two screws. Remove the 14 screws (2) securing the rocker cover (1) to the cylinder head.

**3-63**

NOTE: On 8360 and 8560 tractors the air cleaner assembly and coolant recovery tank will have to be removed before the valve cover can be removed.

Adjust valve clearance as follows:

1. Turn the crankshaft until any pair of valves in the 'Valves Open' column is fully open. Check and adjust the corresponding pairs of valves in the 'Valves to Adjust' column.

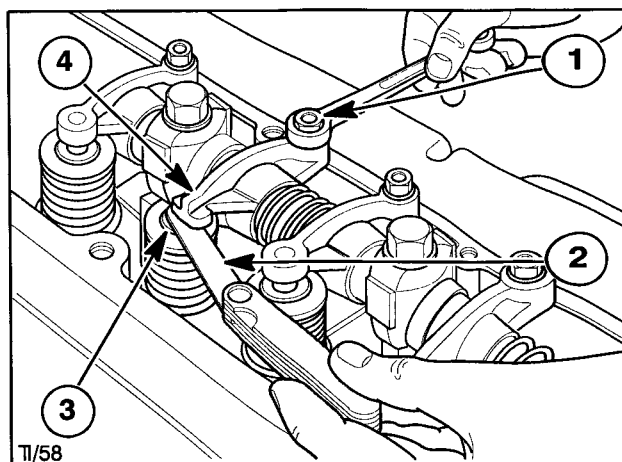
Valves Open

1 intake/3 exhaust
5 intake/6 exhaust
2 exhaust/3 intake
4 exhaust/6 intake
1 exhaust/2 intake
4 intake/5 exhaust

Valves to Adjust

4 exhaust/6 intake
1 exhaust/2 intake
4 intake/5 exhaust
1 intake/3 exhaust
5 intake/6 exhaust
2 exhaust/3 intake

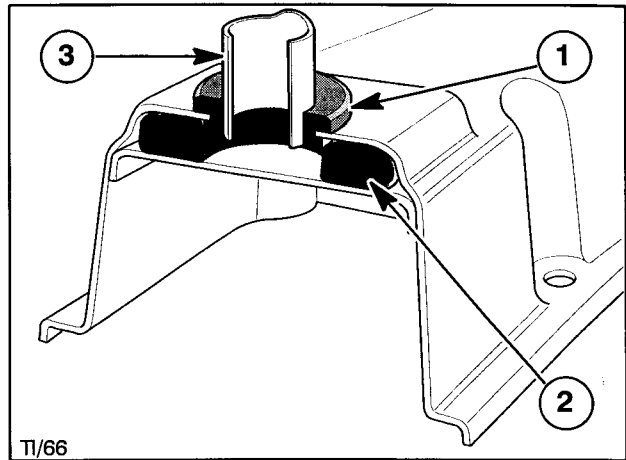
2. Slide a feeler gauge (2), of the correct thickness between the valve stem (3) and rocker arm (4).
3. Turn the rocker arm adjusting screw (1) until the correct clearance is obtained. Turn the screw clockwise to reduce clearance and counter-clockwise to increase clearance.
4. Repeat the process until all the valves have been checked and adjusted.
5. Before installing the rocker cover, change the ventilation filter. See operation 28.

**3-64**

OPERATION 28**CHANGE ENGINE ROCKER VENTILATION FILTER**

Before installing the rocker cover, remove the rubber grommet (1) and extract the gauze filter pad (2). Discard the filter pad.

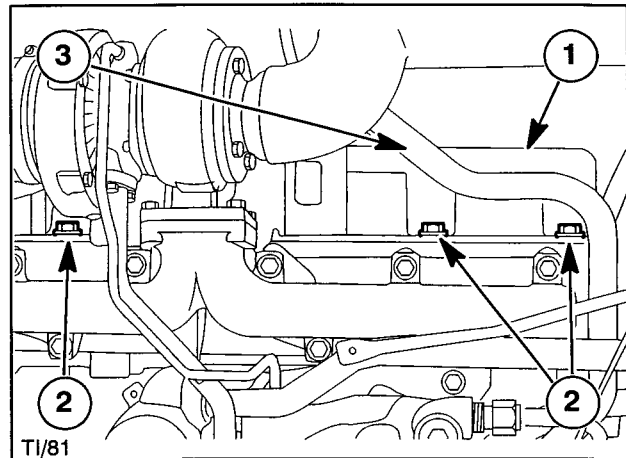
Fold a new filter pad in two and ease it through the aperture in the rocker cover, then open it out to form a complete circle. Re-install the rubber grommet, taking care not to crush the filter pad.

**3-65**

Install the rocker cover (1). Use a new gasket if the original shows signs of damage. Tighten the securing screws (2) evenly, working from the center outwards.

Install the ventilation tube (3) into the grommet and secure the fixing bracket to the left-hand side of the engine block.

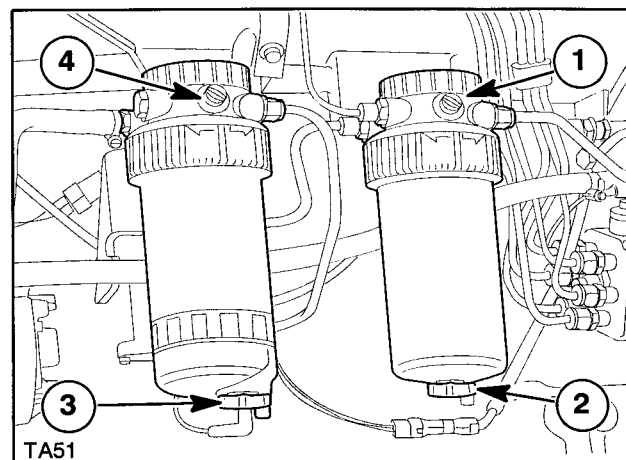
IMPORTANT: When installing the ventilation tube into the grommet. Do **not** push it fully down. The tube is correctly positioned when the lower edge is level with the bottom of the grommet.

**3-66****OPERATION 29****CHANGE FUEL FILTER SECONDARY ELEMENT (FRONT)**

IMPORTANT: Before loosening or disconnecting any part of the fuel injection system, thoroughly clean the area to be worked on to prevent contamination.

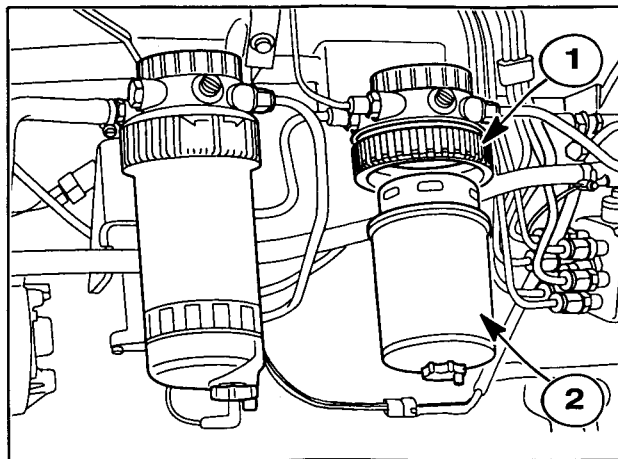
Drain the fuel filter and sedimenter assembly, as follows:

1. Loosen the bleed screws (1) and (4), on the filter and sedimenter assemblies.
2. Open the drain plugs on the sedimenter and filter by loosening the knobs (2) and (3).
3. Allow the fuel to drain out. Catch the fuel in a suitable container and dispose of properly.

**3-67**

4. The retaining ring (1), has quick start thread. Unscrew the retaining ring, remove the filter (2) and dispose of properly.
5. Install a new filter and secure with the retaining ring.
6. With reference to Figure 3-67, close both drain plugs (2) and (3) and the bleed screw (4) on the sedimenter. Turn on the key-start switch to actuate the electric fuel pump and bleed the filter. When fuel, free of air bubbles is emitted from the filter bleed screw hole (1), tighten the bleed screw and turn the key-start switch off.

NOTE: There is no requirement to change the primary (rear) filter at this service. See Operation 30.



3-68

EVERY 1200 HOURS or 12 MONTHS (whichever occurs first) carry out the preceding checks plus the following:

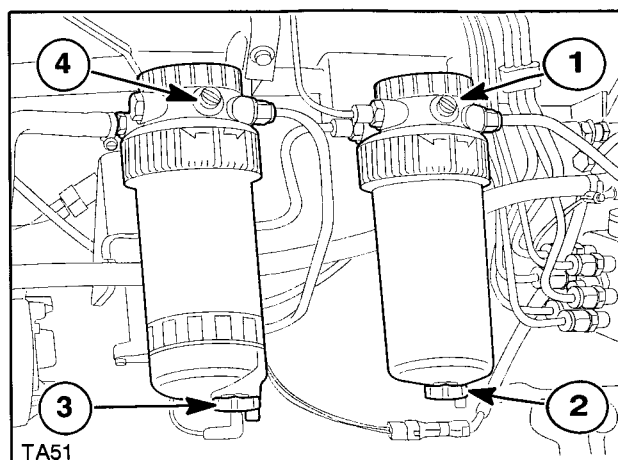
OPERATION 30

CHANGE FUEL FILTER PRIMARY (REAR) ELEMENT

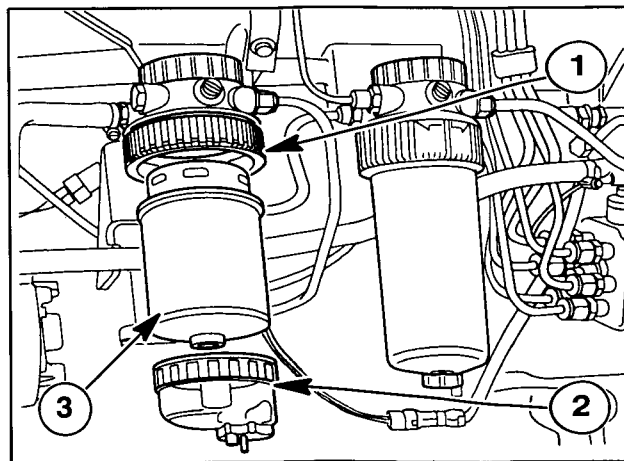
IMPORTANT: Before loosening or disconnecting any part of the fuel injection system, thoroughly clean the area to be worked on to prevent contamination.

Drain the fuel filter and sedimenter assembly, as follows:

1. Loosen the bleed screws (1) and (4) on the filter and sedimenter assemblies.
2. Open the drain plugs on the sedimenter and filter by loosening the knobs (2) and (3). Allow the fuel to drain out. Catch the fuel in a suitable container and dispose of properly.
3. Unscrew and remove the bowl/ring assembly (2) from the sedimenter.
4. The retaining ring (1) has quick start thread. Unscrew the retaining ring, remove the filter (2) and dispose of properly.
5. Install a new filter and the bowl/ring assembly.
6. Bleed the system as in step 6, Operation 29.



3-69



3-70

OPERATION 31 CHANGE CAB AIR FILTERS

To remove a filter, turn the quick release fastener (3) $\frac{1}{2}$ a turn anti-clockwise to free the front of the filter cover (2). Remove the cover (2) and filter element (1). Dispose of the filter elements properly.

Clean both filter chambers with a damp, lint-free cloth.

Install new filter elements (with the rubber seal up) and re-install the covers.

NOTE: The filters are made of specially treated paper with a rubber sealing strip bonded to the upper surface. Take care not to damage the element during installation.

OPERATION 32 CHANGE TRANSMISSION, REAR AXLE, HYDRAULIC OIL AND FILTERS

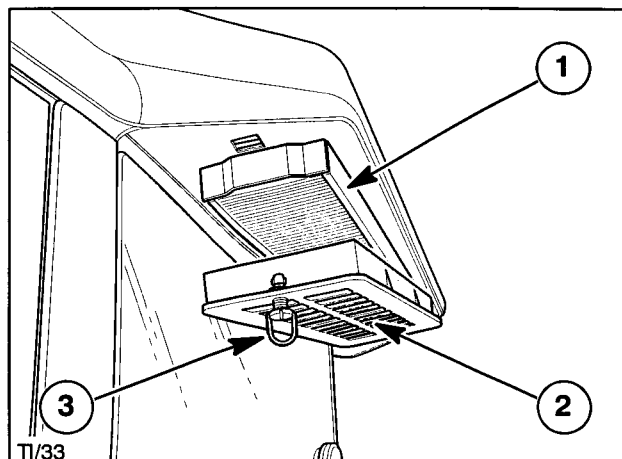
Prior to changing the oil, run the engine and operate the hydraulic system until the oil is warm. Park the tractor on level ground, lower the three-point linkage and stop the engine. Engage the parking brake and block wheels on both sides.

WARNING: Be very careful to avoid contact with hot oil. If oil is extremely hot, allow it to cool to a moderately warm temperature before proceeding.

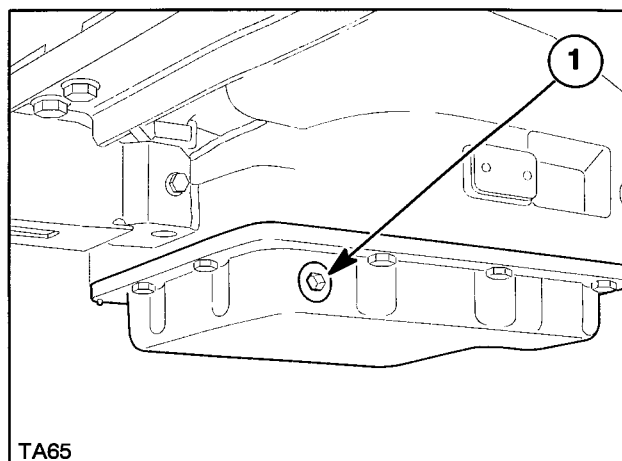
To change the oil:

1. Remove the drain plug (1) and completely drain all oil into a suitable container. Be prepared to catch up to 26.4 gal. (100 liters). Dispose of the oil properly.
2. Re-install the drain plug after the oil has drained.

IMPORTANT: Perform operation 16 (change hydraulic and transmission filters) before refilling with oil.



3-71



3-72

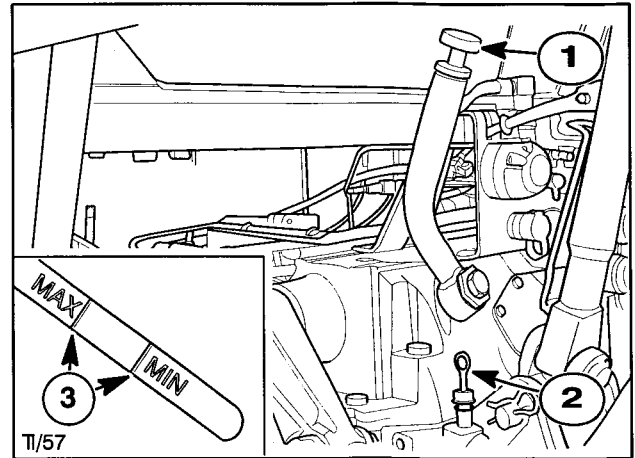
3. Remove the filler cap (1) and refill with new oil.
4. Run the engine and operate the hydraulic system. Fully raise the three-point linkage.
5. Stop the engine and wait five minutes while checking the system for leaks.
6. Check the oil level by means of the dipstick (2). Add oil as required until the oil level is between the 'MIN' and 'MAX' marks (3).

NOTE: Do not fill above the full mark.

See section 5 for the correct oil specification.

Oil Capacity:

8160, 8260, 8360 w/23Fx12R	19.2 gal. (73 litres)
8160, 8260, 8360 w/18Fx6R	23.7 gal. (90 litres)
8560	26.4 gal. (100 litres)



3-73

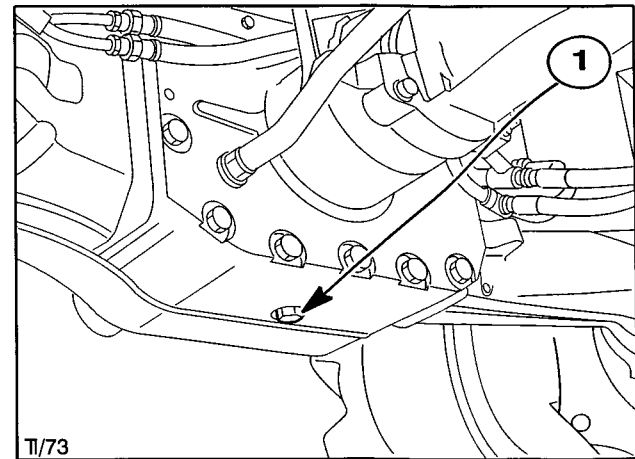
OPERATION 33

CHANGE FWD DIFFERENTIAL OIL

Park the tractor on level ground and engage the park brake.

To change the oil:

1. Remove the drain plug (1) and completely drain all oil into a suitable container. Be prepared to catch up to 3.7 gal. (14 litres). Dispose of the oil properly.



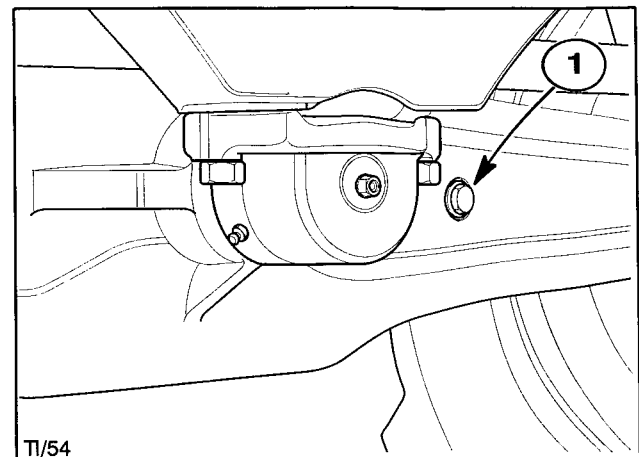
3-74

2. Re-install the drain plug. Remove the level/filler plug (1).
3. Fill with new oil until it reaches the bottom of the level/filler plug hole. Re-install level/filler plug.

See section 5 for the correct oil specification.

Oil Capacity:

8160, 8260	2.3 gal. (9.0 litres)
8360, 8560	3.7 gal. (14 litres)



3-75

OPERATION 34**CHANGE FWD PLANETARY HUB OIL**

Park the tractor on level ground and engage the park brake.

NOTE: The hubs on 8160 and 8260 tractors (Figure 3-76) are different in size and appearance to those on the 8360 and 8560 models (Figure 3-77).

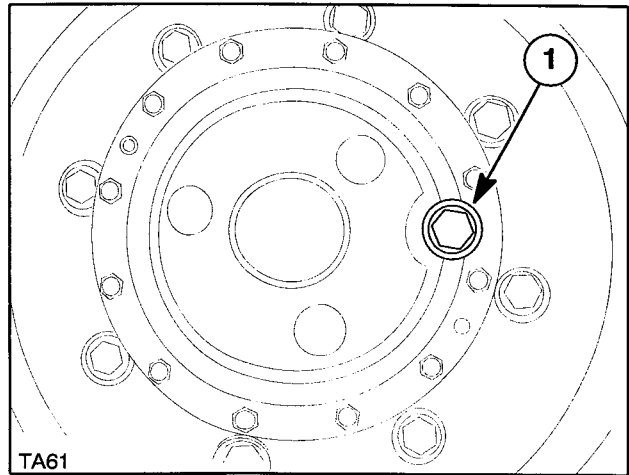
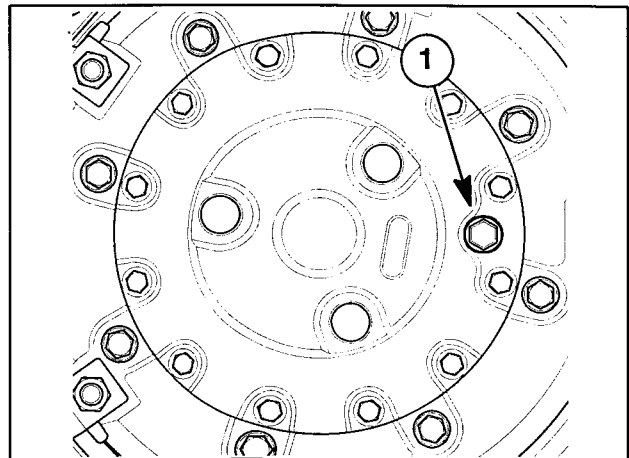
To change the oil:

1. Position the wheel so the filler/drain/level plug (1) is at the lowest point. Remove the plug and completely drain all oil into a suitable container. Dispose of the oil properly.
2. Rotate the wheel so that the combined level/filler plug (1) is at the 3 o'clock position.
3. Refill the hub with new oil until it reaches the bottom of the level/filler plug hole (1). Install the plug.
4. Repeat the process on the other hub.

See section 5 for the correct oil specification.

Oil Capacity (each hub):

8160, 8260	1.8 qt. (1.7 litres)
8360, 8560	2.3 qt. (2.15 litres)

**3-76****3-77**

OPERATION 35**BATTERIES**

IMPORTANT: *This operation applies only to batteries on tractors operating in **temperate** climates. Tractors operating in tropical climates should have the battery electrolyte level checked every 300 hours. See operation 14.*

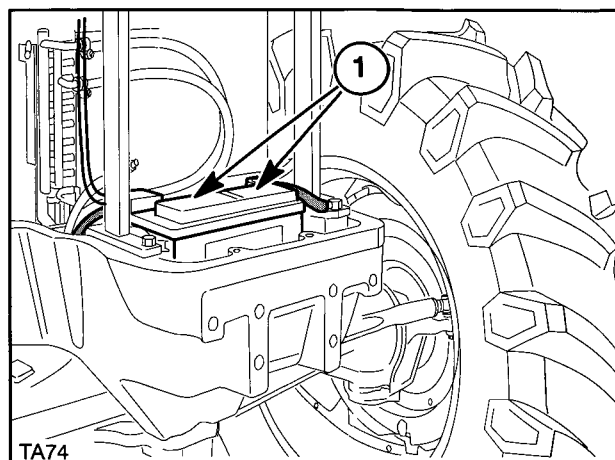
Use a screwdriver to pry the covers (1) from the top of the batteries and expose the vent holes. Using a pencil or similar shaped piece of wood as a dipstick, check that the electrolyte level is 0.65 in. (17 mm) above the top of the separator plates in each cell.

IMPORTANT: *Do not use a metal probe to check the electrolyte level.*

If necessary, refill with distilled water until the level is correct. Do not overfill. Never use tap water or rain water.

To prevent the formation corrosion the terminals should be cleaned and lightly coated with petroleum jelly.

IMPORTANT: *In the event that the batteries become severely discharged, such that terminal voltage is below 7 volts, recovery will require a special charging procedure. See your authorized dealer.*

**3-78**

EVERY 1200 HOURS or 24 MONTHS (whichever occurs first)
carry out the preceding checks plus the following:

OPERATION 36**CHANGE ENGINE COOLANT AND FILTER/
CONDITIONER – Figures 3-79 to 3-87**

A replaceable coolant filter/conditioner is installed on the tractor. The filter/conditioner canister contains a filter element and a conditioner in the form of a paste. As coolant flows through the filter, the paste dissolves and mixes with the coolant to provide optimum engine corrosion protection.

IMPORTANT: *The new filter contains a measured amount of chemical inhibitor in paste form. The amount of conditioner and the size of the filter element are matched to the cooling capacity of the tractor. It is important that this filter is changed every 1200 hours (or 24 months, whichever occurs first) if total protection of the engine cooling system is to be maintained. The use of a non-approved filter may jeopardize this protection.*

The conditioner in the filter will:

- Increase rust prevention.
- Reduce scale formation.
- Minimise cylinder wall erosion (pitting).
- Reduce foaming of the coolant.


As the conditioner works and protects the system, it gradually loses its strength and must be replenished.

Replacing the filter at the specified interval ensures maximum protection.


IMPORTANT: *Install a new filter/conditioner in the event of a large coolant loss such as a failed coolant hose, etc.*

IMPORTANT: *Do not replace the filter/conditioner more frequently than specified unless a large coolant loss occurs.*

IMPORTANT: *Anti-leak additives should not be used. The clogging properties of these additives could affect the performance of the filter and conditioner.*

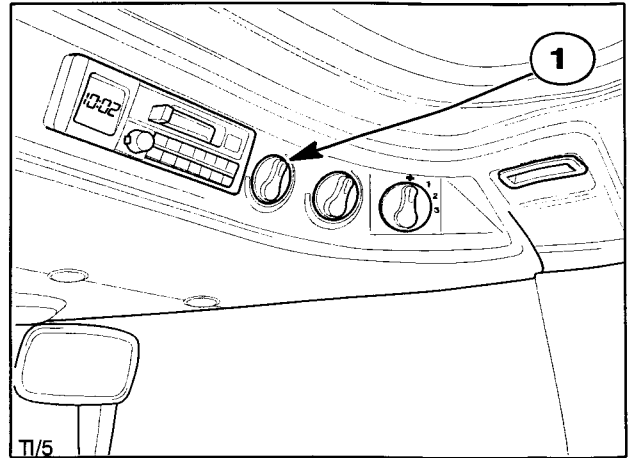
 **WARNING:** *The coolant system operates under pressure which is controlled by the radiator pressure cap. It is dangerous to remove the pressure cap while the system is hot. When the system has cooled, use a thick cloth and turn the cap slowly to the first stop and allow the pressure to escape before fully removing the cap. Coolant should be kept off the skin. Adhere to the precautions outlined on the antifreeze and inhibitor containers, where used.*

Park the tractor on level ground, engage the parking brake and block the wheels front and rear.

 **WARNING:** *Allow the engine to cool before draining the coolant.*

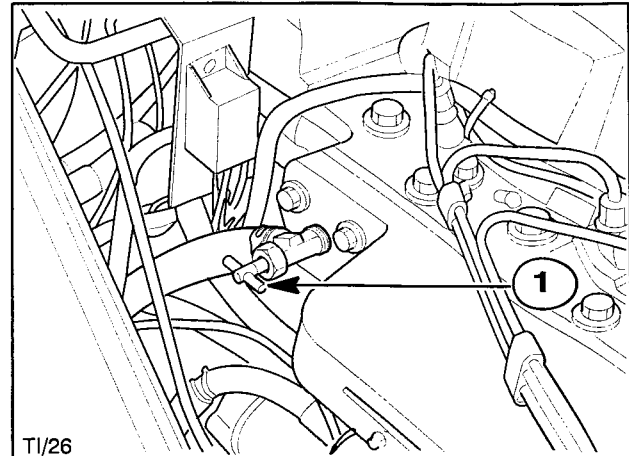
To change coolant and the filter/conditioner:

1. Turn the heater control knob (1) to the maximum heat position (fully clockwise).



3-79

2. Check that the heater shutoff valve (1) is open.



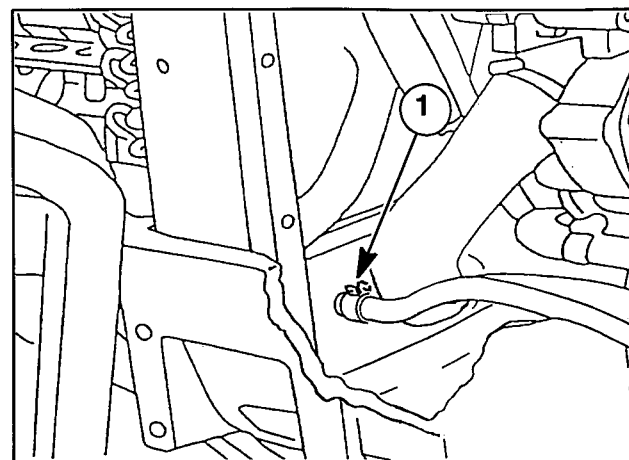
3-80

3. Disconnect the radiator lower heater return hose, (1) and drain all the coolant into a suitable container. Be prepared to catch up to 6.8 gal. (26 liters). Dispose of the coolant properly.

NOTE: Less cab tractors can also be drained at this location. Remove the cap and install a short hose to allow coolant to drain into a suitable container.

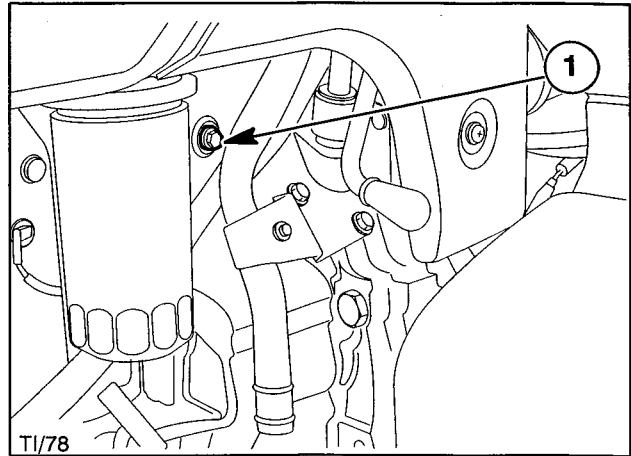


WARNING: Coolant should be kept off the skin. Adhere to the precautions outlined on the antifreeze container.



3-81

4. Remove the drain plug (1) from the left-hand rear of the engine block. Drain all the coolant into a suitable container. Dispose of the coolant properly.

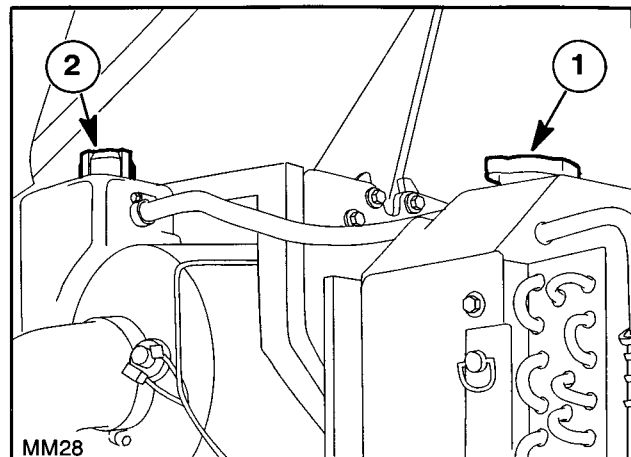


3-82

5. To increase the drainage rate, remove the radiator cap (1) and recovery tank cap (2).
6. Flush the system with a commercial cooling system cleaner. Follow the instructions supplied with the cleaner. Drain the cleaner and let the engine cool.

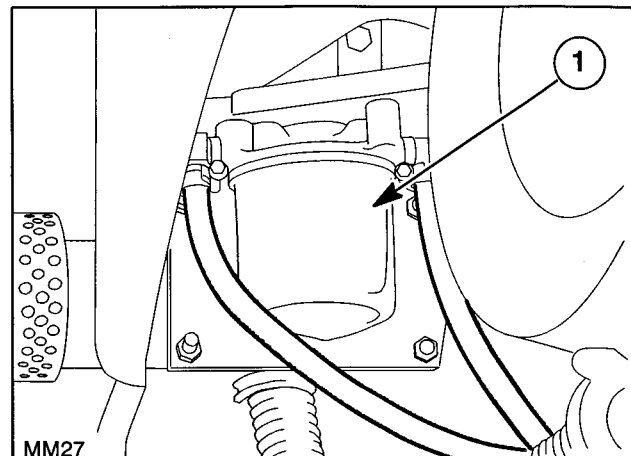
IMPORTANT: *Never put cold coolant in a hot engine. The difference in temperature could cause the block or head to crack.*

7. Re-install the engine drain plug and the radiator lower hose.
8. Fill the system with clean water and run the engine for 10 minutes, then drain all the water. Allow the engine to cool.



3-83

9. Unscrew and remove the filter/conditioner (1). Dispose of properly.
10. Install a new filter/conditioner until the seal contacts the manifold. Tighten an additional $\frac{1}{2}$ to $\frac{3}{4}$ turn. Do **not** overtighten.

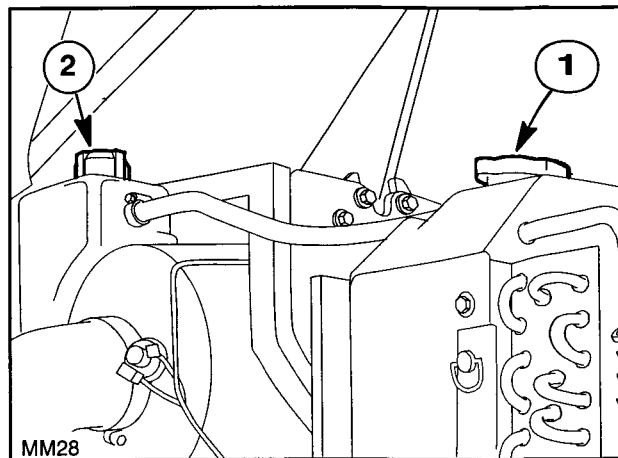


3-84

11. Fill the cooling system with a 50/50 blend of low silicate antifreeze and clean, soft water. Add coolant slowly through the radiator filler neck, 1, until the coolant is to the bottom of the filler neck.

NOTE: To avoid trapping air in the system, fill the radiator as slowly as practicable thereby allowing any air pockets to disperse.

12. Inspect cooling system hoses and connections for leaks.



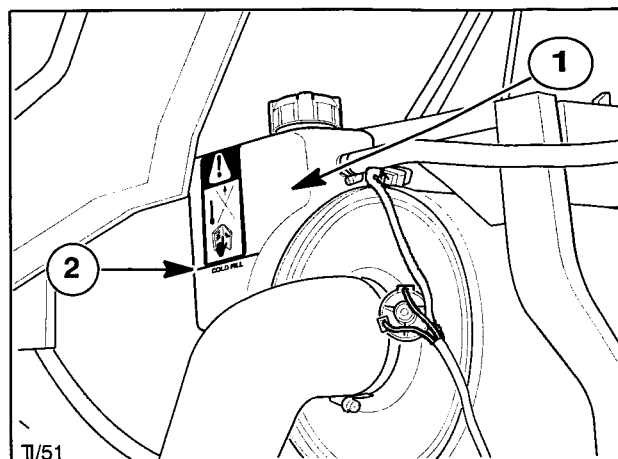
3-85

13. Fill the coolant recovery tank (1) to the cold fill mark (2).

14. Start the engine and run it until normal operating temperature is reached.

NOTE: The coolant level will drop as coolant is pumped around the system.

15. Stop the engine and allow the coolant to cool.



3-86

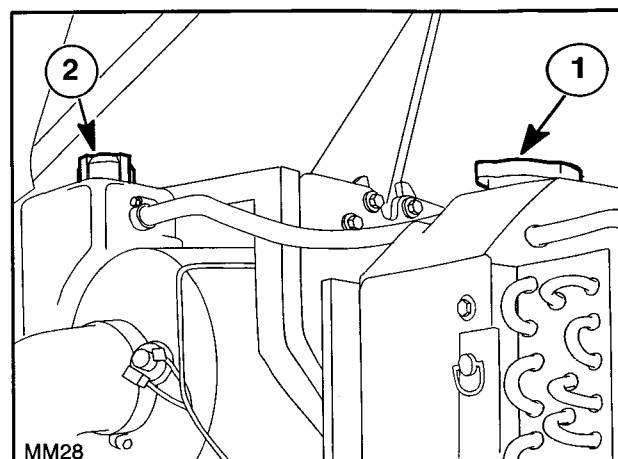
16. Remove the radiator cap (1) and add coolant to the radiator to bring the coolant level to the bottom of the filler neck. Install the radiator cap. Add coolant to the recovery tank as required to bring the level up to the cold mark (2).

NOTE: If the engine is not going to be operated immediately following the coolant and filter change, run the engine for one hour to ensure that the chemical conditioner within the filter is dispersed into the cooling system.

See section 5 for the correct coolant/antifreeze specification.

Coolant Capacity

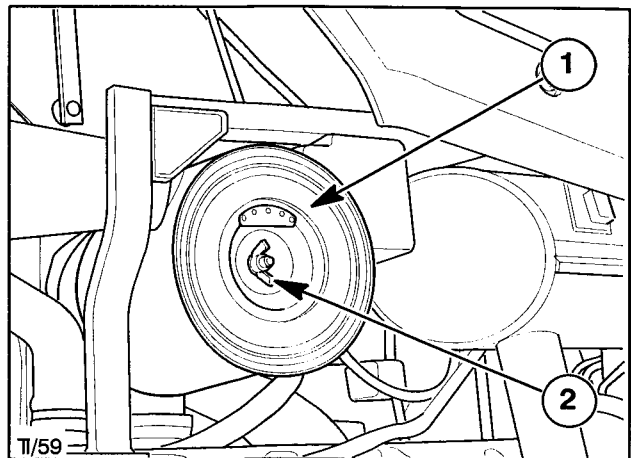
8160 & 8260 models (with cab)	6.7 gallons (25.5 litres)
8160 & 8260 models (less cab)	6.2 gallons (23.5 litres)
8360 & 8560 models (with cab)	6.8 gallons (26.0 litres)
8360 & 8560 models (less cab)	6.3 gallons (24.0 litres)



3-87

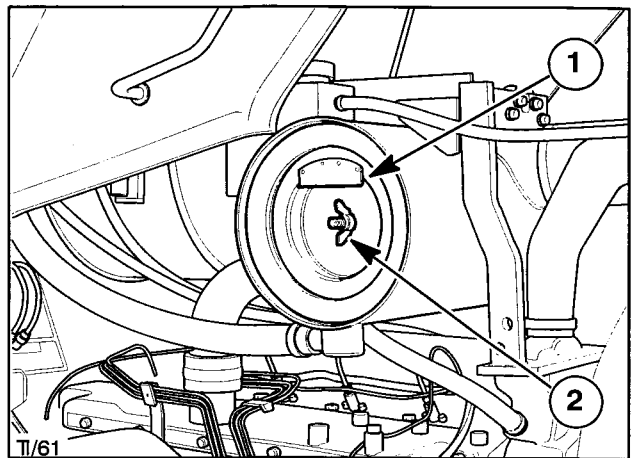
OPERATION 37**CHANGE ENGINE AIR CLEANER INNER AND OUTER ELEMENTS**

The air cleaner (1) is accessible from the left-hand side on 8160 and 8260 models. The air cleaner is accessed from the right-hand side on 8360 and 8560 models.

**3-88**

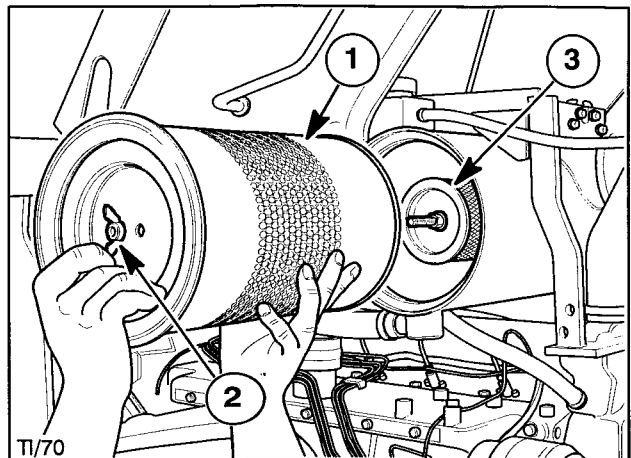
The outer element (1) is being removed from a 8360 or 8560 model. The removal of the element from other models is similar.

1. Unscrew the wing nut (2) and remove the outer element (1) from the air cleaner assembly.

**3-89**

NOTE: Examine the inside of the outer element. If dust is present, the outer element is defective and must be replaced. If it is not necessary to replace the outer element at this service, wash the element as detailed in operation 1, method C.

2. Unscrew the central securing nut and remove the inner element (3) from the air cleaner assembly.
3. Dispose of the inner element properly (and the outer element, if replaced at this service).
4. Clean the inside of the air cleaner housing using a damp, lint-free cloth.
5. Install a new inner element and secure with nuts.
6. Install a cleaned or new outer element. Tighten the wing nut.

**3-90**

NOTE: Replace the wing nut seal if it is damaged.

IMPORTANT: Failure to install the inner filter element properly could result in engine damage. Therefore it is recommended that the element be installed by an authorized dealer.

EVERY 1800 HOURS carry out the preceding checks plus the following:

OPERATION 38

CLEAN AND RESET FUEL INJECTORS

IMPORTANT: *The injectors should be cleaned and adjusted by an authorized dealer or diesel repair station.*

WARNING: *Diesel fuel escaping under pressure can penetrate the skin causing serious injury.*

Do not use your hand to check for leaks. Use a piece of cardboard or paper to search for leaks. Wear eye protection.

- *Stop the engine and relieve pressure before connecting or disconnecting lines.*
- *Tighten all connections before starting the engine or pressurising lines.*

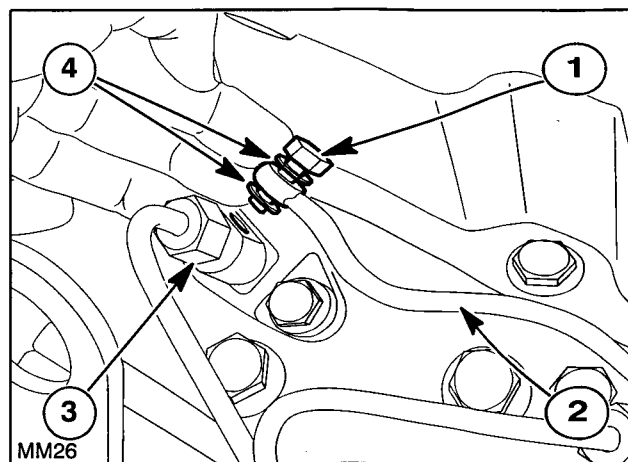
If any fluid is injected into the skin, obtain medical attention immediately.

IMPORTANT: *Before loosening or disconnecting any part of the fuel injection system, thoroughly clean the area to be worked on.*

IMPORTANT: *Place caps on all open lines or injector openings to prevent the entry of dirt.*

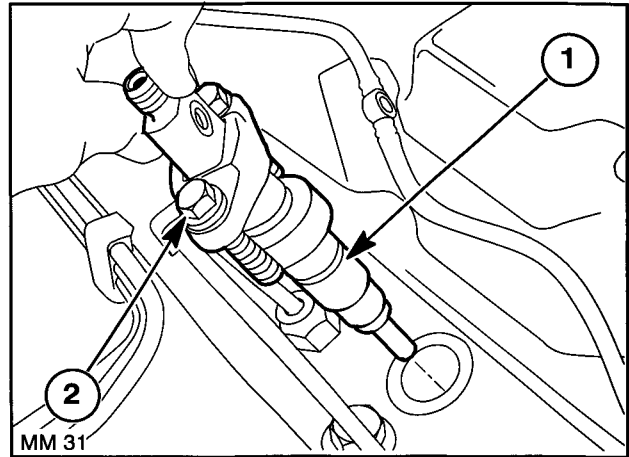
Use the following procedure to remove and replace the injectors:

1. Remove the leak off line retaining bolt (1) and the leak off line (2). Discard the two copper washers (4), installed either side of the banjo fitting.
2. Unscrew the nut (3) and disconnect the high pressure injector line from the injector.



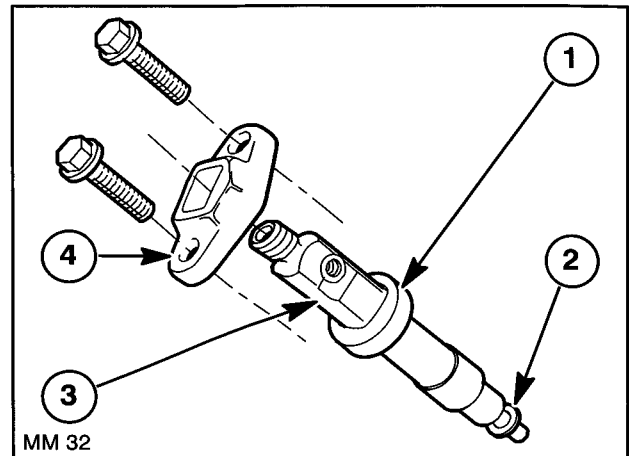
3-91

3. Remove the two injector retaining bolts and washers (2). Turn the injector (1) clockwise to loosen it, then remove from the head.



3-92

4. Remove the copper sealing washer (2), from the injector (3). If the washer is not on the injector it has remained in the head and must be extracted. Discard the copper washer.
5. Remove and discard the cork dust seal (1) from the injector.
6. Repeat the process on the remaining injectors.
7. The injectors which were removed should be serviced by an authorized dealer.
8. After servicing, install a new cork dust seal (1), on the injector and fit a new copper washer (2) to the end of the injector.

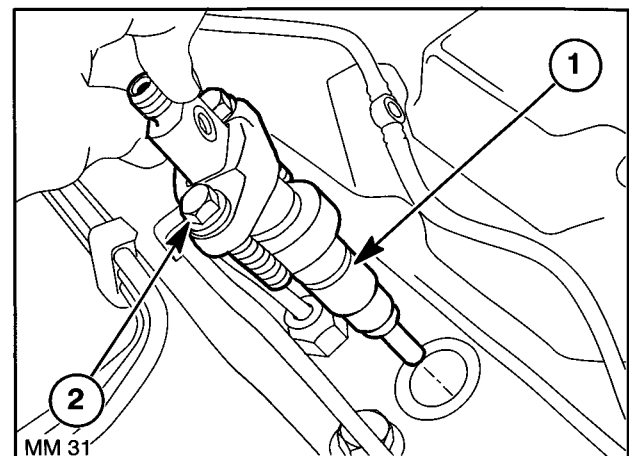


3-93

9. Install the injector with the leak-off port (3) facing the valve cover, as shown.

NOTE: Ensure that the clamp (4) Figure 3-93, is installed with the raised side uppermost, as shown.

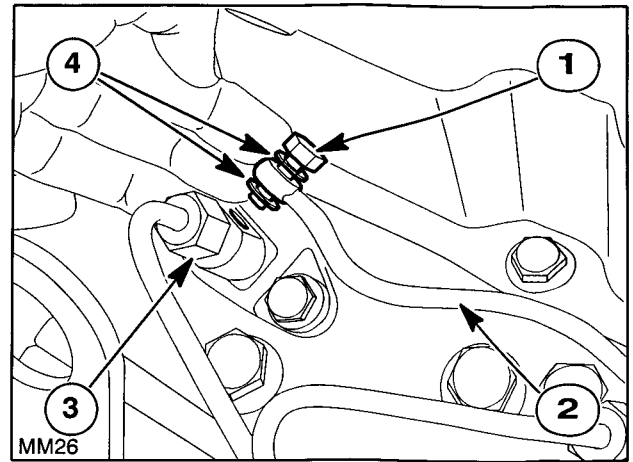
10. Install the injector retaining bolts and washers. Torque the bolts evenly to 17 lbf. ft. (23 Nm).



3-94

11. Install the leak off line (2), using new copper washers (4) on either side of the banjo fitting. Torque the leak off line retaining bolt (1) to 53 lbf. in. (6 Nm).
12. Install the high pressure line and tighten the nut (3), to 18 lbf. ft. (24 Nm).
13. Repeat the process on the remaining injectors.
14. Bleed the fuel system as detailed in Operation 39 in this section.
15. Start the engine and visually inspect for leaks.

NOTE: *Unauthorized modification or adjustment of fuel injection equipment outside specification will invalidate the warranty.*



3-95

GENERAL MAINTENANCE (to be performed as and when required)

OPERATION 39

BLEEDING THE FUEL INJECTION SYSTEM

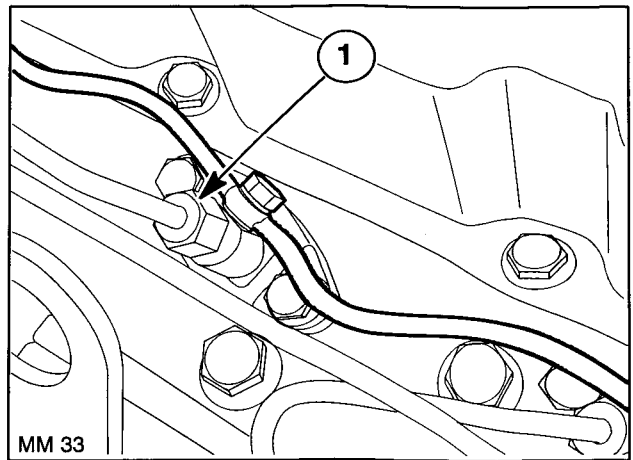
It may be necessary after injection pump removal, replacement of injector high pressure lines or after running out of fuel, to purge the system of air to allow the engine to start.

If the engine fails to start after several turns, after one of the above situations has occurred, bleed the system using the following procedure:

1. Ensure the tractor has adequate fuel and the battery is fully charged.
2. 'Crack' open the nuts (1) on the high pressure lines to each of the injectors. With the aid of an assistant, crank the engine using the starter motor to expel the air. Tighten the injector nuts as the engine begins to fire.



WARNING: *Diesel fuel escaping under pressure can penetrate the skin causing serious injury.*



3-96

OPERATION 40**TRANSMISSION CLUTCH CALIBRATION
(23 F x 12 R transmission only)**

NOTE: 23 F x 12 R transmission has directional clutches that require periodic calibration to compensate for wear. This service should be performed at the 50 hour service thereafter only if a deterioration in gear shifting quality is noted. It is recommended that this operation be performed by an authorized dealer.

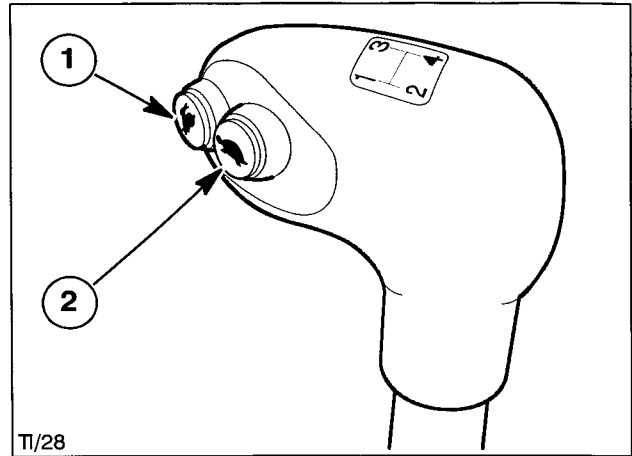
IMPORTANT: During the calibration procedure, the transmission control module detects precisely the point at which the clutches start to engage. This engagement is detected by a very small reduction in engine speed. During calibration, it is essential that no action is taken to cause the engine speed to vary. Be sure that the air conditioner and all electrical equipment is switched off. Do not operate the PTO or any hydraulic lever or move the hand or foot throttle.

Preparing the Tractor for Calibration

NOTE: The clutches should be adjusted when the transmission oil is at a temperature of 68° F (20° C) or above.

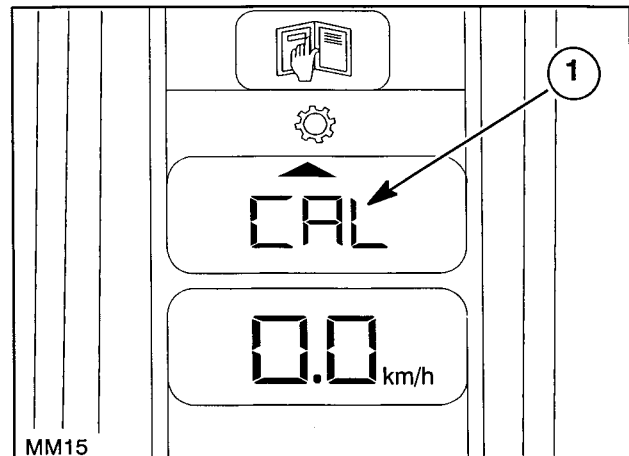
Prior to calibrating the directional clutches, do the following:

1. Park the tractor on level ground away from any obstacles (in case of unexpected tractor movement).
2. Turn off all electrical equipment, including the air conditioning, stop the engine and place remote hydraulic controls in the neutral position. Lower hydraulic equipment to the ground.
3. Engage the parking brake, place all gear shift levers in neutral. Block the wheels, front and rear.
4. Press and hold in both up/down shift buttons (1) and (2), on the main gearshift lever. While holding in the buttons, start the engine.
5. 'CAL' will be displayed in the transmission display on the instrument console. Release the up/down shift buttons.



T1/28

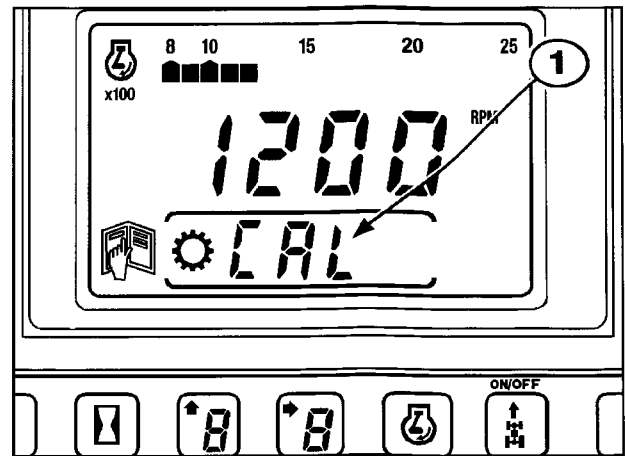
3-97



MM15

3-98

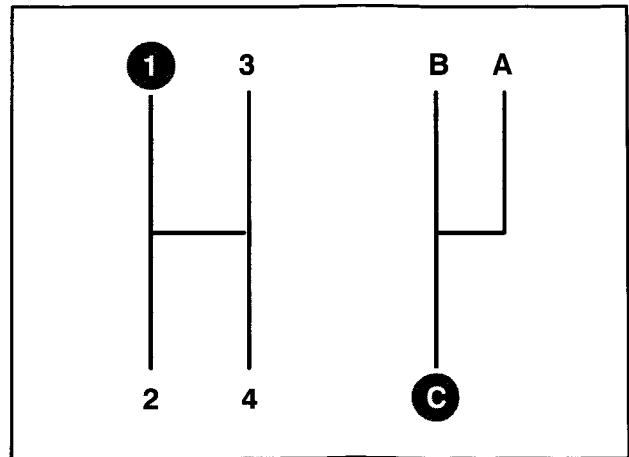
NOTE: On electronic instrument consoles, CAL will be displayed in the central LCD below the engine speed.



3-99

6. Depress the clutch pedal and use the gear shift levers to select 1st. gear, high range (C), forward shuttle position. Release the clutch pedal.
7. Adjust engine speed, by means of the hand throttle, to 1200 ± 100 rev/min.

The transmission is now ready for calibration.

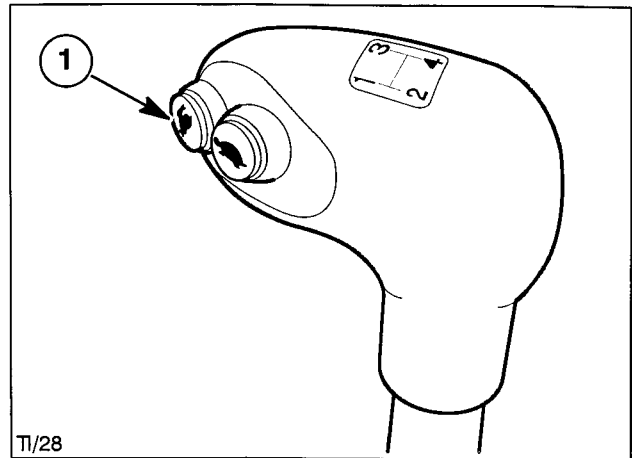


3-100

Upshift Clutch Calibration

To calibrate the upshift clutch:

1. Press and hold in the upshift button (1) on the main gearshift lever. If an error code ('U' followed by a two digit number) is displayed in the instrument panel, then the calibration conditions have not been met. See table on page 3-51 for explanation of error codes.
2. If calibration conditions are correct, 'Hi' will be briefly displayed then a numerical value (current in milliamps) will display. The number displayed will be a low value, gradually increasing until the reading is steady when a slight reduction in engine speed will be noted.
3. Release the upshift button.
4. The upshift clutch calibration is complete.

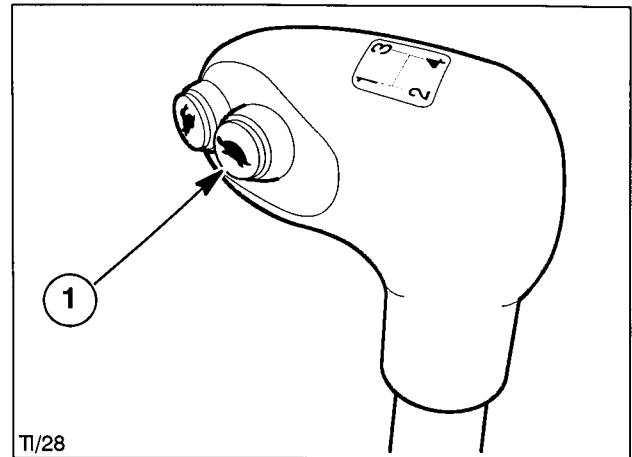


3-101

Downshift Clutch Calibration

To calibrate the downshift clutch:

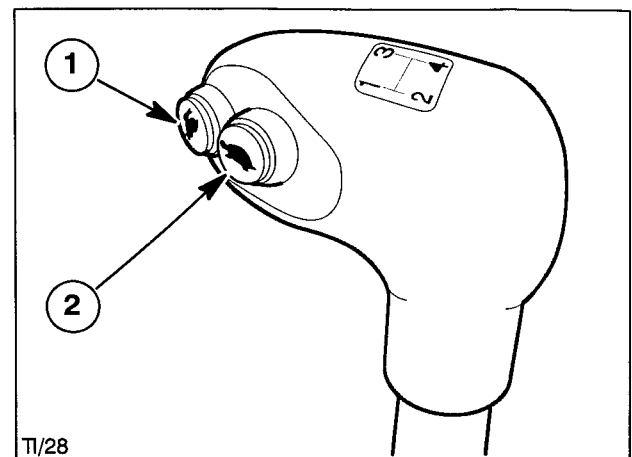
1. Press and hold in the downshift button (1) on the main gearshift lever. If an error code ('U' followed by a two digit number) is displayed in the instrument panel, then the calibration conditions have not been met. See table on page 3-51 for explanation of error codes.
2. If calibration conditions are correct, 'Lo' will be briefly displayed then a numerical value (current in milliamps) will display. The number displayed will be a low value, gradually increasing until the reading is steady when a slight reduction in engine speed will be noted.
3. Release the downshift button.
4. The downshift clutch calibration is complete.



3-102

Synchro Calibration

1. Press and hold in both the upshift and downshift buttons (1) and (2) on the main gearshift lever. If an error code ('U' followed by a two digit number) is displayed in the instrument panel, then the calibration conditions have not been met. See table below for explanation of error codes.
2. Under normal calibration conditions, 'Soc' will be displayed for a few seconds then the numbers 1 to 5 will be displayed sequentially, indicating progression through the synchronizer offset calibration. When calibration is completed, 'End' will be displayed.



3-103

To Exit the Calibration Mode

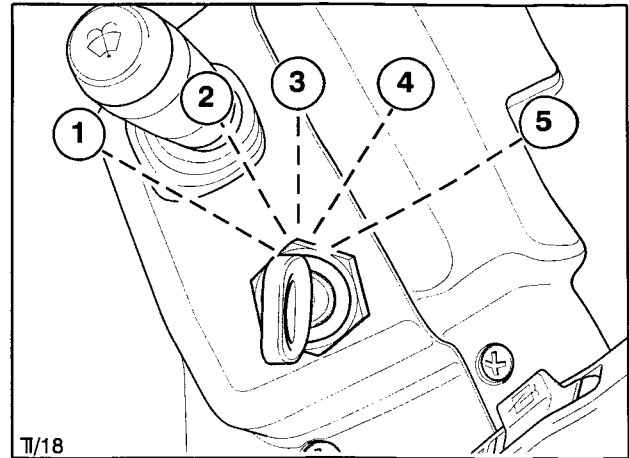
To exit the calibration mode:

1. Turn the key-start to the OFF position (3), then ON again (position 4).

The tractor is now ready for normal operation.

Error Codes

Code	Meaning
U20	Correct start up sequence was not used. Depress and release the clutch pedal, then repeat the high range clutch calibration procedure.
U21	Engine speed too low (1200 ± 100 rev/min)
U22	Engine speed too high (1200 ± 100 rev/min)
U23	Shuttle lever not in forward position.
U24	Main gear lever not in 1st. gear.
U25	Range lever not in high range.
U26	Clutch pedal not fully released.
U27	High clutch calibration too low. Starting pressure sufficient to cause engine pull down.
U28	High clutch calibration too high. Max. test pressure reached without drop in engine speed.
U29	Low clutch calibration too low. Starting pressure sufficient to cause engine pull down.
U30	Low clutch calibration too high. Max. test pressure reached without drop in engine speed.
U31	Tractor wheel movement detected.
U37	Synchronizer shuttle mode calibration – Synchro potentiometer feedback outside limits.
U38	Synchronizer hi/lo mode calibration – Synchro potentiometer feedback outside limits.
U39	Synchronizer neutral mode calibration – Synchro potentiometer feedback outside limits.



3-104

OPERATION 41

CLUTCH FILL TIME CALIBRATION

(23 F x 12 R transmission only)

Clutch fill time is the time taken for the hydraulic clutches to fill with oil. If the fill time is too long then there will be a delay in engaging drive when using the inching pedal (clutch pedal).

Conversely, if the fill time is too short, some jerkiness will be noted when using the inching pedal.

Special equipment is required to carry out this calibration procedure. In the unlikely event that these symptoms are encountered, see your authorized dealer.

OPERATION 42**TRANSMISSION CLUTCH CALIBRATION****(17 F /18 F x 6 R transmission only)**

NOTE: 17 F/18 F x 6 R transmission has five directional clutches that require periodic calibration to compensate for wear. This service should be performed at the 50 hour service thereafter only if a deterioration in gear shifting quality is noted. It is recommended that this operation be performed by an authorized dealer.

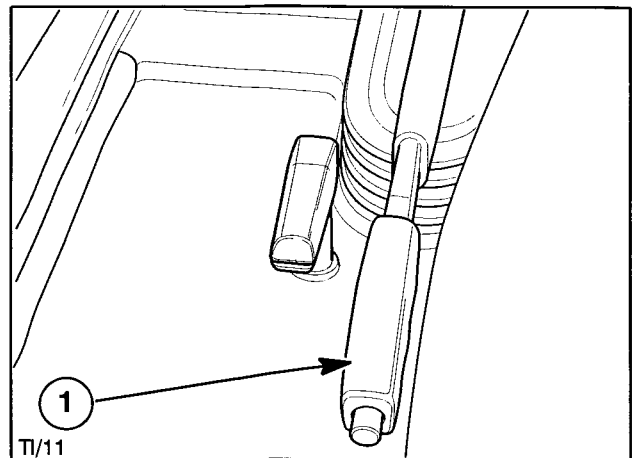
IMPORTANT: During the calibration procedure, the electronic management system detects precisely the point at which the clutches start to engage. This engagement is detected by a very small reduction in engine speed. During calibration, it is essential that no action is taken to cause the engine speed to vary. Be sure that the air conditioner and all electrical equipment is switched off. Do not operate the PTO or any hydraulic lever or move the hand or foot throttle.

Preparing the Tractor for Calibration

NOTE: Clutch calibration should be carried out when the transmission oil temperature is between 68° F (20° C) and 122° F (50° C).

Prior to calibrating the directional clutches, carry out the following:

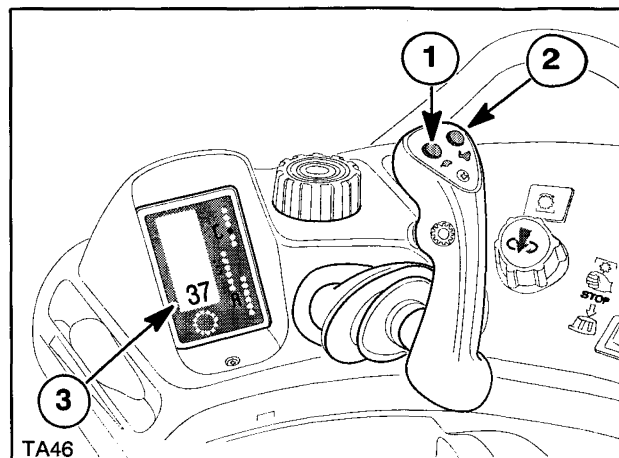
1. Park the tractor on level ground away from any obstacles (in case of unexpected tractor movement). Turn off all electrical equipment, including the air conditioning, stop the engine and place remote hydraulic controls in the neutral position. Lower hydraulic equipment to the ground.
2. Engage the parking brake (1). Block the wheels, front and rear.

**3-105**

3. Press and hold in both powershift buttons (1) and (2), on the main gearshift lever. While holding in the buttons, start the engine then release the buttons. The transmission oil temperature, in ° C, will be displayed at (3). Press the downshift button (1) to proceed.
- If the oil temperature is satisfactory, the display (3) will change to 'A' and you can go straight to step 4.
 - If the oil temperature is too cold, the display will show 'U19' or 'CL'. Press the upshift button (2) to leave the calibration mode, then operate the tractor to warm the oil. Repeat steps 1, 2 and 3.
 - If the oil temperature is above 122° F (50° C), the display will show 'CH'. Press the upshift button to exit the calibration mode, allow the oil to cool, then go to step 3.



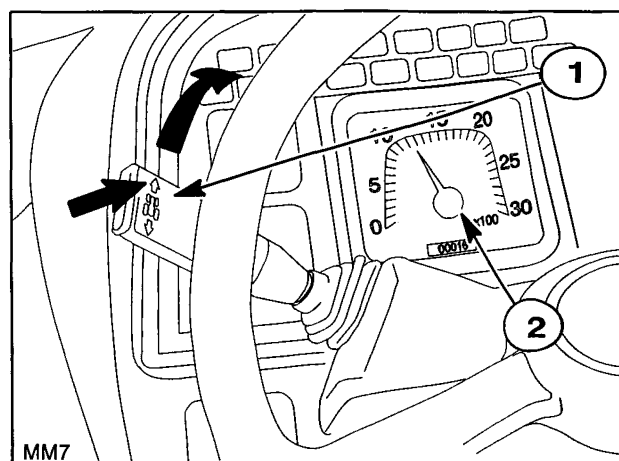
WARNING: *Keep hands away from hot transmission oil pipes.*



3-106

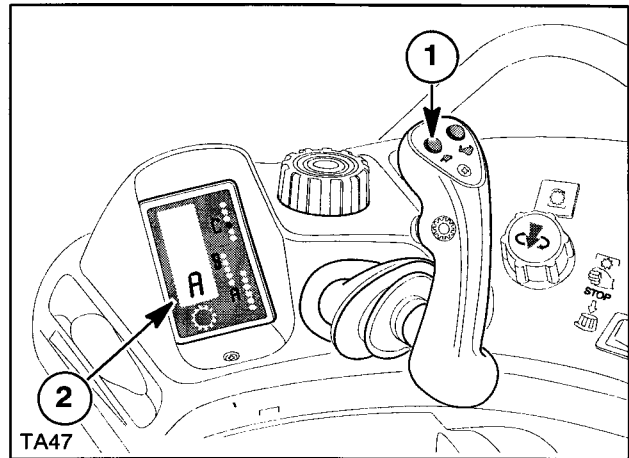
Clutch and Synchronizer Calibration

4. Move the shuttle lever (1), to the forward drive position.
5. Adjust engine speed (2), by means of the hand throttle, to 1200 ± 100 rev/min. The display will show 'CU' for 3 seconds, while verifying correct engine speed.



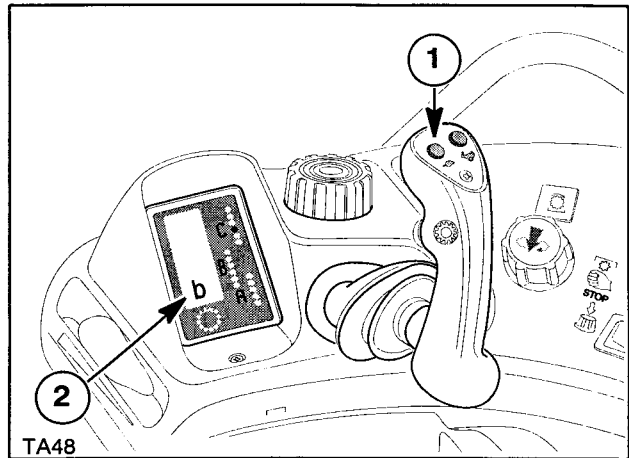
3-107

6. Press and hold the downshift button (1) to calibrate clutch pack 'A'. The display (2) will show 'A', indicating that clutch pack A is ready for calibration.
7. Press and hold in the downshift button (1), to calibrate clutch A. The display (2) will show a value in milliamps for several seconds while engine speed stability is monitored and the synchronisers are shifted, then the value displayed will increase quite rapidly. Calibration is complete when the display alternates between the final value (in milliamps) and the letter 'A'.



3-108

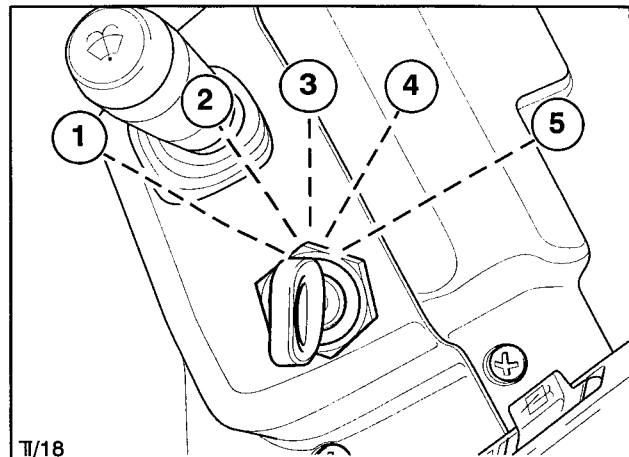
8. Release the downshift button (1). The display (2) will change to 'b', indicating that clutch pack B is ready for calibration.
9. Repeat steps 7 and 8 for clutches B, C, D and E. After clutch E has been calibrated, release the downshift button and the display will change to 'F'.
10. Press the downshift button again. The synchronizers will be shifted to neutral and synchronizer stroke relationship will be checked. If satisfactory, the display will show 'CF'.



3-109

11. Turn the key-start switch to the off position (2) to store the calibration values.

The tractor is now ready for normal operation.

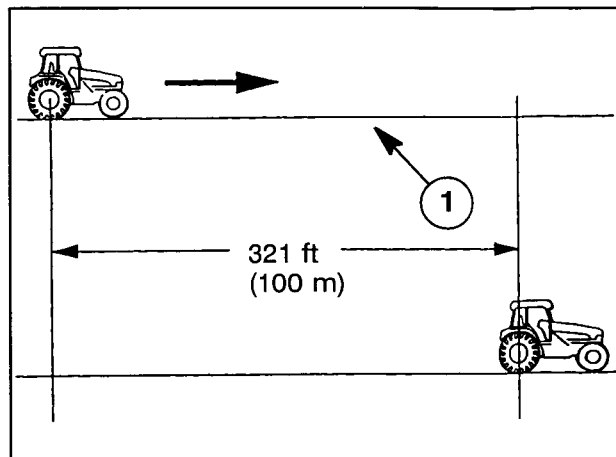


3-110

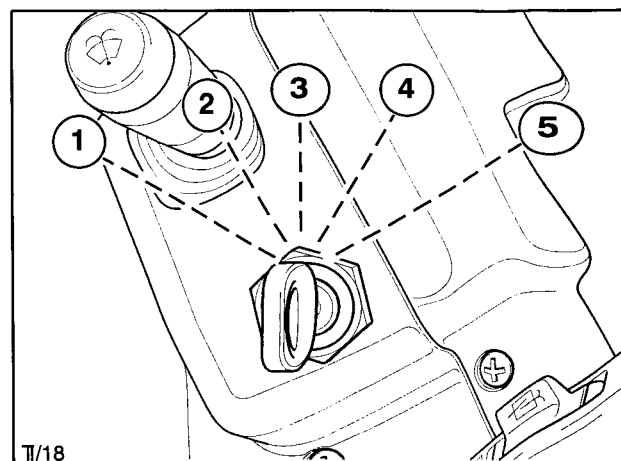
OPERATION 43**CALIBRATION OF THE EMU (Electronic Management Unit)**

The EMU and touchpanel are calibrated at the factory to ensure that the unit is set up for your particular tractor build. If any change is made to the tractor specification, such as change of tire size, installation of a new radar unit or steering angle sensor then recalibration will be required.

Before calibration, it will be necessary to find a convenient stretch of straight, level road, at least 321 ft. (100 metres) long. Draw two chalk lines across the road exactly 321 ft. (100 metres) apart (1).

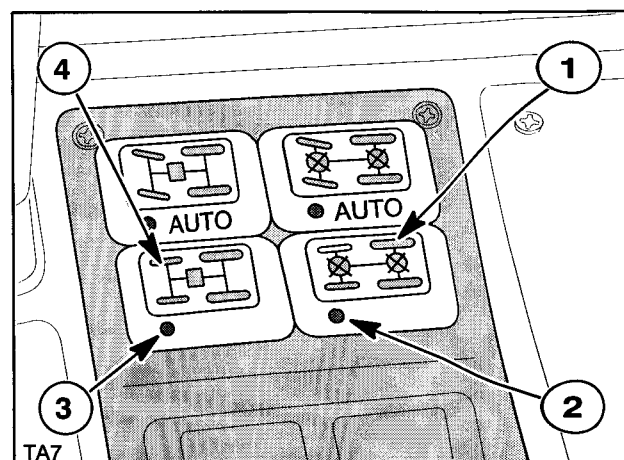
**3-111**

1. Position the tractor in front of the first mark in the road and turn the key-start switch to the off position (2).

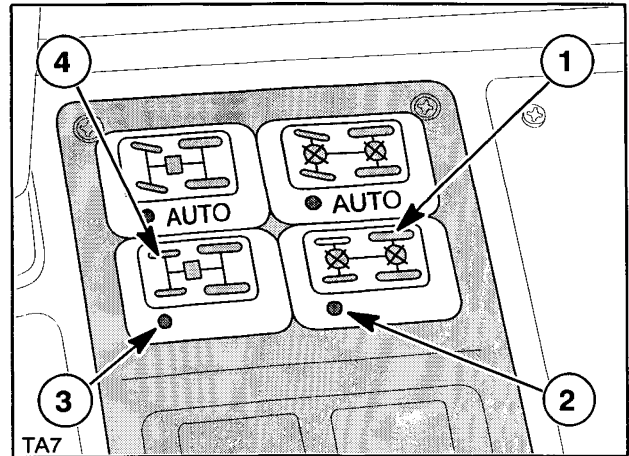
**3-112**

2. While depressing both the manual differential lock touchpad (1) and the manual front wheel drive touchpad (4), turn the keystart switch to the start position (5) Figure 3-112 to start the engine, then release the key. The LED's (2) and (3), will flash. The EMU is now in the calibration mode and the letters 'CL' will be displayed. See (1) Figure 3-115 or 3-116, according to the type of instrument console installed.

NOTE: If your tractor is equipped with the 3-pad touch panel then the manual differential lock touchpad and the manual four wheel drive touchpad will be in the same position as shown.

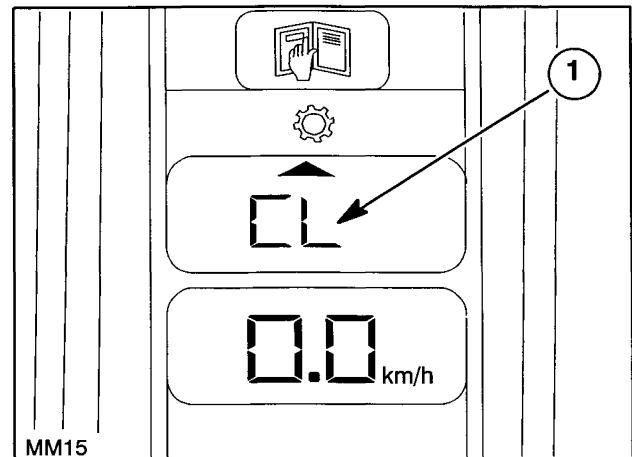
**3-113**

3. Select a gear and drive the tractor over the measured 321 ft. (100 metres). As you pass over the first chalk mark, momentarily depress the differential lock touchpad (1). The differential lock LED (2) will flash at a slower rate and the letters 'CL' (in the instrument panel) will also flash.



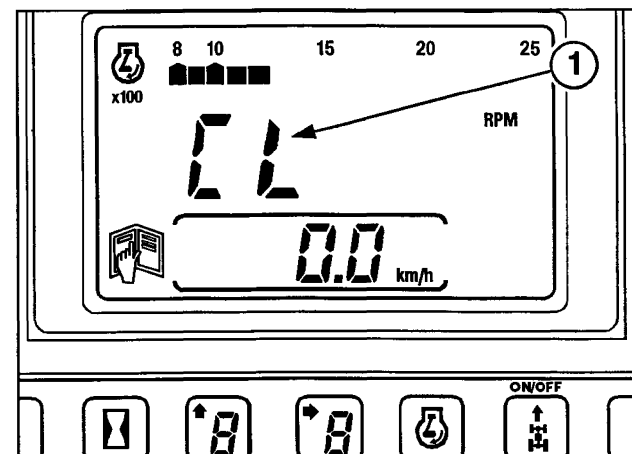
3-114

4. As the tractor passes over the second mark in the road, momentarily depress the differential lock touchpad a second time. The CL letters (1) in the instrument panel will become steady.



3-115

5. Stop the tractor and turn the key-start switch off. Calibration is now complete and the tractor ready for normal operation.



3-116

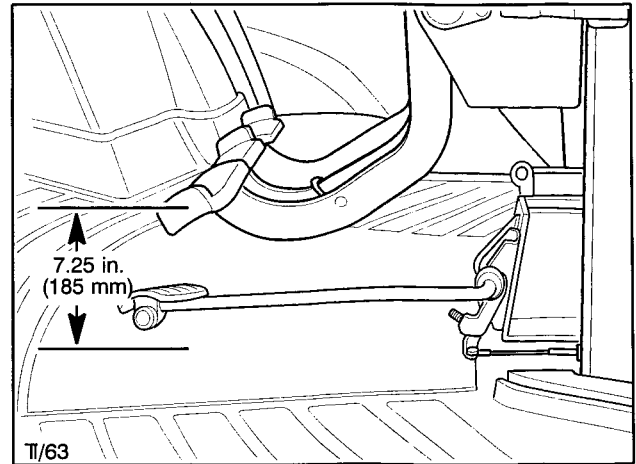
OPERATION 44**CHECK FOOTBRAKES**

The hydraulically actuated brakes require no adjustment for wear. However, the brake pedals should be checked to ensure that they are correctly balanced.

Block the wheels to prevent accidental tractor movement and release the handbrake.

Unlatch the brake pedals so that they may be operated independently.

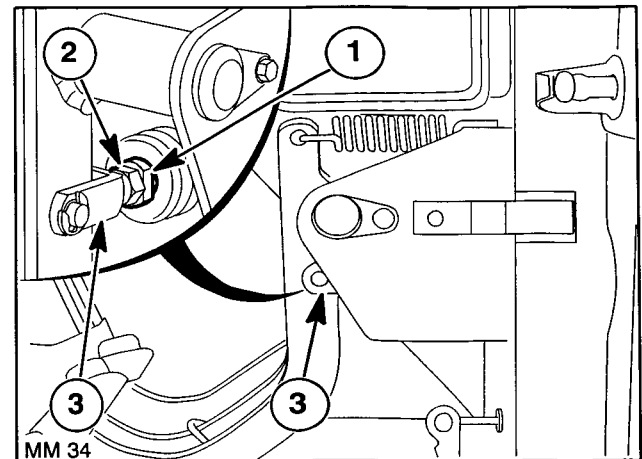
Press down both brake pedals, by hand, until resistance is met, indicating that the brakes are just applied. The distance between the centers of the brake pedal pads and the floor should be approximately 7.25 in. (185 mm). For correct operation, both pedals should be at exactly the same height.

**3-117**

If adjustment is needed, loosen the locknut (2) on each of the yokes (3).

NOTE: *There is a yoke connected to each brake assembly.*

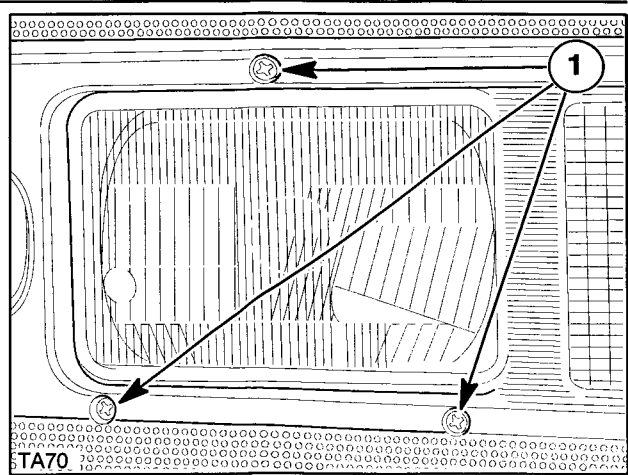
Using an open ended wrench, screw the adjuster (1) in or out until the brakes are balanced.

**3-118**

OPERATION 45**HEADLIGHT AND WORKLAMP ADJUSTMENT****Headlights**

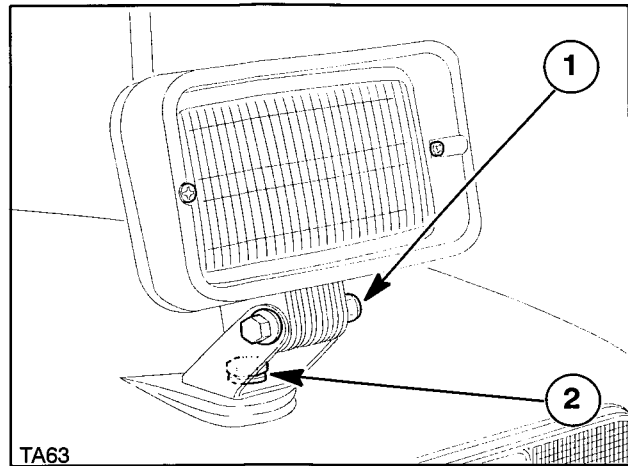
To avoid blinding oncoming drivers, adjust the angle of the headlight beams.

Each headlight is secured to the bezel by three spring-loaded screws (1). The beam may be adjusted vertically or laterally by turning one or more of the screws in or out, as required.

**3-119****Worklamps**

Dependent upon model and specification, adjustable worklamps may be installed on the front and rear of the cab roof, low down at the front of the cab or on the rear fender. Non-adjustable worklamps are mounted on the front of the hood, adjacent to the headlights.

To adjust a worklamp, simply tilt the lamp assembly up or down, as required. Loosen the clamp nut (1), if necessary. To swivel the lamp sideways, loosen the bolt (2), that attaches the mounting bracket to fender, cab frame or grab rail, and turn the bracket.

**3-120**

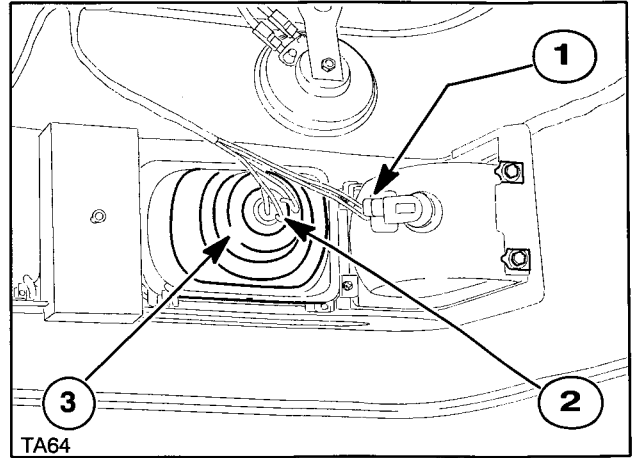
Tighten the nuts/bolts, after adjustment.

OPERATION 46**BULB REPLACEMENT****Headlights and Hood-mounted Worklamps**

The headlights and two non-adjustable worklamps are mounted in a moulded unit attached to the radiator grill. All bulbs are accessible from the rear of the lamp unit, inside the hood area.

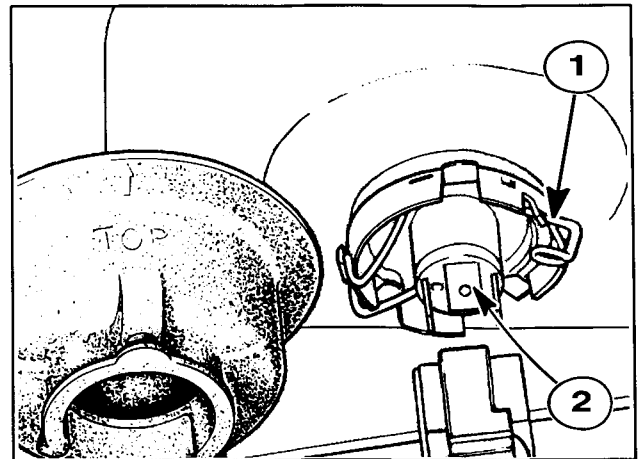
To change a worklamp bulb, first unclip and pull off the electrical connector (1). Rotate the bulb assembly a quarter turn counterclockwise and remove. Re-assemble in reverse order.

To change a headlight bulb, first pull off the electrical connector (2) and remove the rubber cap (3) from the rear of the lamp assembly.

**3-121**

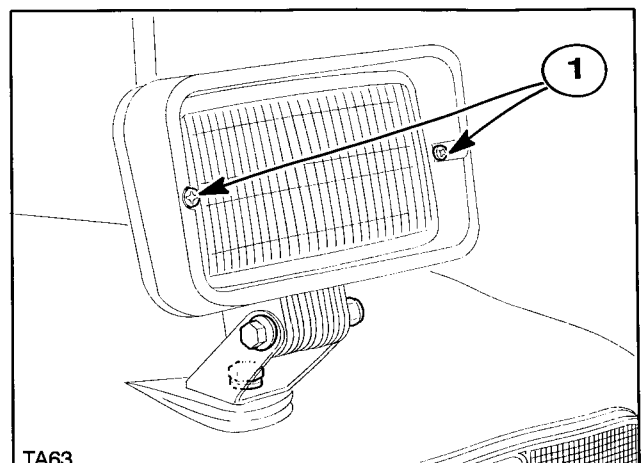
IMPORTANT: All headlights and worklamps have halogen bulbs. Never touch a halogen bulb with your fingers. Natural moisture in the skin may cause the bulb to fail prematurely when switched on. Always use a clean cloth or tissue when handling halogen bulbs.

Unhook the retaining spring (1) and remove the bulb assembly (2). Re-assemble in reverse order.

**3-122****Adjustable Worklamps**

To replace a worklamp bulb, remove the two screws (1) and take out the complete lamp assembly from the body. Bulb replacement is then the same as for the hood-mounted worklamps, described above.

NOTE: Some worklamps may have four securing screws in place of the two shown.

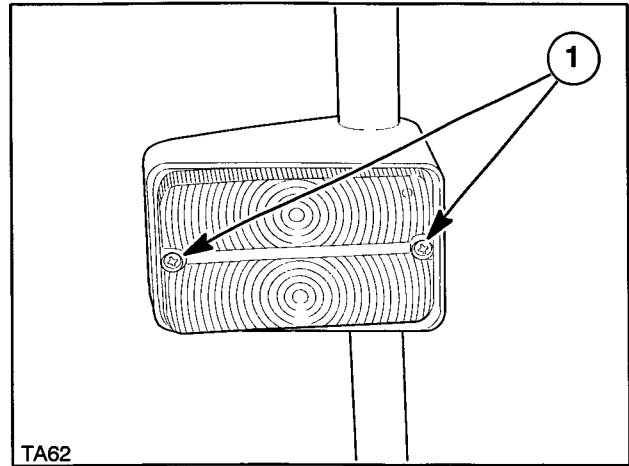
**3-123**

Turn/Position Lamps

Although there are differing styles of lamp, front and rear, access to the bulbs is as described in the following text and as shown.

The bulbs are accessible after removal of the plastic lens assembly. Remove the two screws (1) and take out the lens/reflector assembly. The bulbs have a conventional bayonet cap and may be removed by pressing in and turning approximately 20° anti-clockwise. Re-assemble in reverse order.

IMPORTANT: When replacing the lens, take care not to overtighten the retaining screws.



TA62

3-124

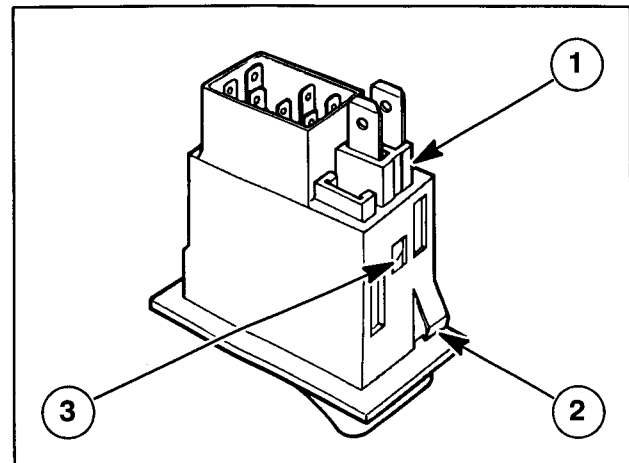
Rocker Switch Bulbs

Certain rocker switches are internally illuminated, the bulb being removable from the rear of the switch assembly.

The switch assembly is retained by a spring tang (2) at either end. Use a small screwdriver to pry one end of the rocker switch from the console and withdraw the switch assembly.

To change a bulb, press in the tang (3) using a small screwdriver and pull the bulb retainer (1) from the back of the assembly. The bulbs are of the capless type, rated at 1.2w and are a push fit in the retainer.

After changing the bulb, push the retainer (1) into the back of the switch assembly until the tang locates in the aperture. Re-install the switch assembly.

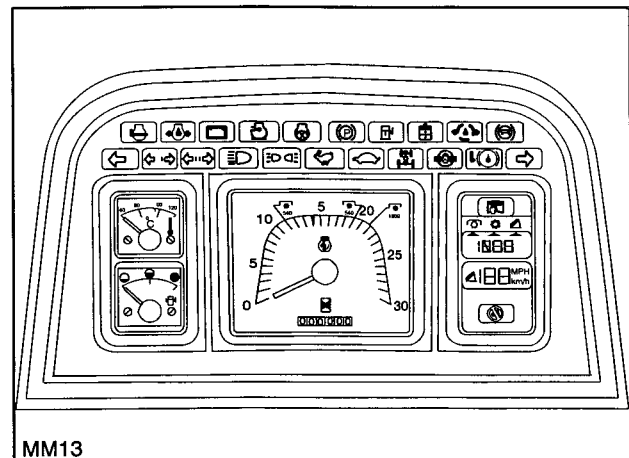


3-125

Instrument Panel Bulbs

The warning and panel light bulbs are removable from the rear of the instrument panel. To gain access, remove the two retaining screws from the lower edge of the instrument panel and withdraw the instrument panel assembly. Disconnect the electrical connectors from the rear of the panel.

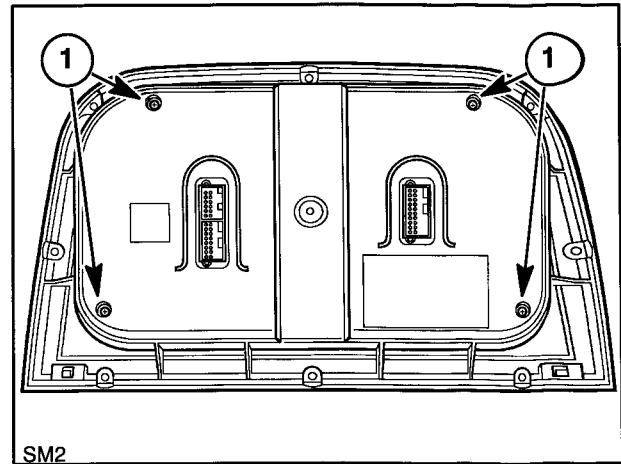
NOTE: There are two types of instrument panel available and the rear views shown may differ from the panel fitted to your tractor. However the method of removing the rear cover and bulbs is similar on both models.



MM13

3-126

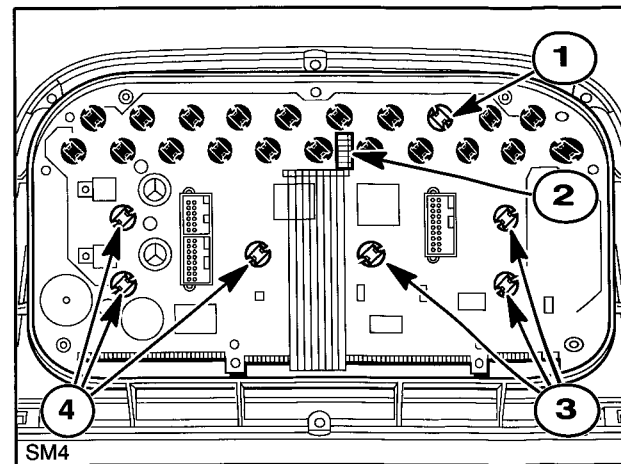
Remove the four screws (1), holding the cover to the rear of the panel.



3-127

Turn the failed bulb $\frac{1}{4}$ turn counter-clockwise and remove. Re-assemble in reverse order.

IMPORTANT: The two rows of warning light bulbs at the top of the panel are colored black, except for the alternator warning light bulb (1), which is red. The red bulb is of a different wattage to the others and it is important that the correct bulb is used in this position otherwise the alternator may not function. The instrument backlight bulbs (3) and (4) are colored yellow.



3-128

IMPORTANT: If your tractor has the electronic instrument panel, removal of the rear cover will expose six micro-switches (2). The switches are used in the factory to set up the computer module. Do **not** touch any of these switches as the performance of the instrument panel and associated electronic equipment may be affected and your warranty may be invalidated.

OPERATION 47

FUSES AND RELAYS

The fuse box is located behind a panel on the right-hand side of the instrument console.

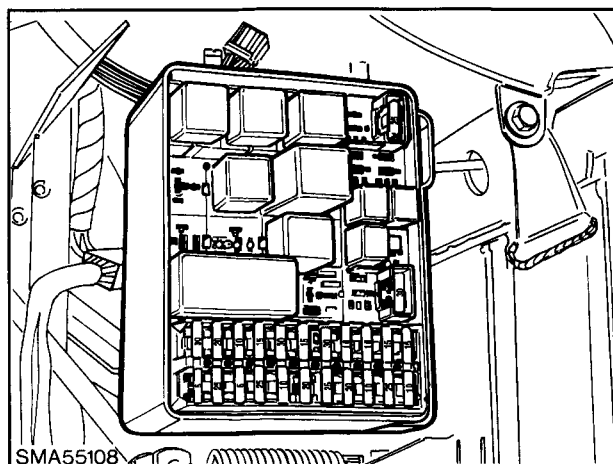
The fuse box has a snap on lid. Pull off the lid of the fuse box to gain access to the fuses and relays.

There are provisions for 24 fuses although they may not all be installed to the tractor. In addition, certain items of equipment may not be installed on the tractor. However, the fuses for these features are still installed and may be used as spares.

IMPORTANT: Do not replace a blown fuse with another of a different rating.

The fuses are numbered and color-coded as shown in the chart.

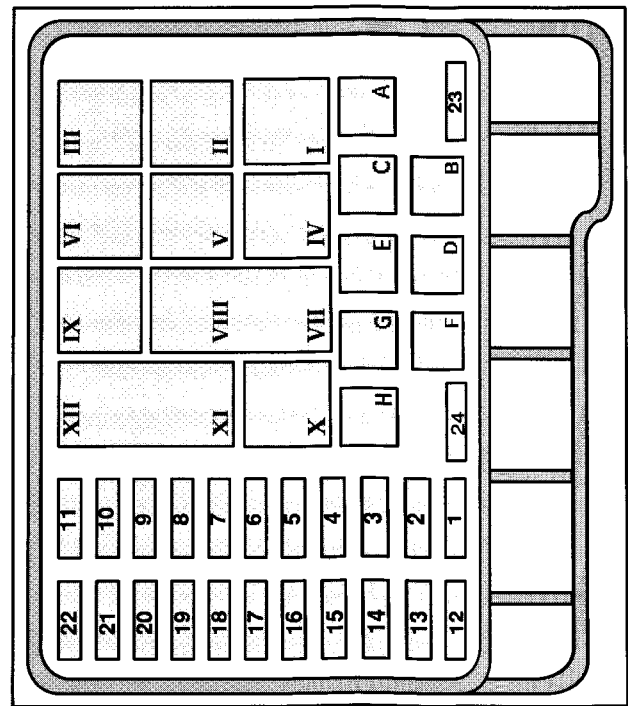
NOTE: Items I to XII and A to H are relays and the chart on the next page). Not all the relays shown may be installed. See your authorized dealer if you have a problem with any of the circuits listed that is not caused by fuse failure.



3-129

Fuse No.	Amps	Color	Circuit
1	15	Lt. blue	Headlight main beam
2	15	Lt. blue	Headlight low beam
3	10	Red	side light R.H.
4	10	Red	side light L.H.
5	30	Green	Work lamps (grille-mounted)
6	15	Lt. blue	Work lamps (rear fenders)
7	30	Green	Work lamps (front/rear cab roof)
8	15	Lt. blue	Fuel shut off/pump/water sensor
9	10	Red	Gauges/external switches/radar
10	20	Yellow	Hazard lights
11	30	Green	Horn/headlight flasher, cigar lighter & roof beacon
12	10	Red	E.D.C.
13	25	Natural	E.M.U. module, diff lock, 4WD and worklamp touch panel
14	10	Red	Transmission shuttle
15	30	Green	Stop lamps, seat pump, trailer brake, diverter valve & front hitch
16	25	Natural	Heater fan
17	20	Yellow	Washer-wiper, console lamp & temperature control
18	10	Red	Turn indicators
19	25	Natural	Thermostart
20	5	Tan	'Keep alive' memory for E.D.C., E.M.U. & radio
21	25	Natural	Transmission control module & clutch switch
22	5	Tan	Radio
23	25	Natural	Accessory socket/interior light
24	30	Green	Implement socket

Relay	Circuit Identification
I	Ignition relay
II	Hydraulic diverter valve relay
III	Thermostart relay
IV	Flasher unit
V	Fuel pump relay
VI	Not used
VII & VIII	Front hitch control module
IX	Trailer brake
X	Not used
XI & XII	I.S.O. or N.A.S.O. flasher module
A	T.C.M. solenoid valve power relay
B	Upper front work lamps relay
C	Upper rear work lamps relay
D	Lower front work lamp relay
E	Lower rear work lamps relay
F	Fuel shut-off relay
G	Stop lamps relay
H	Trailer brake relay



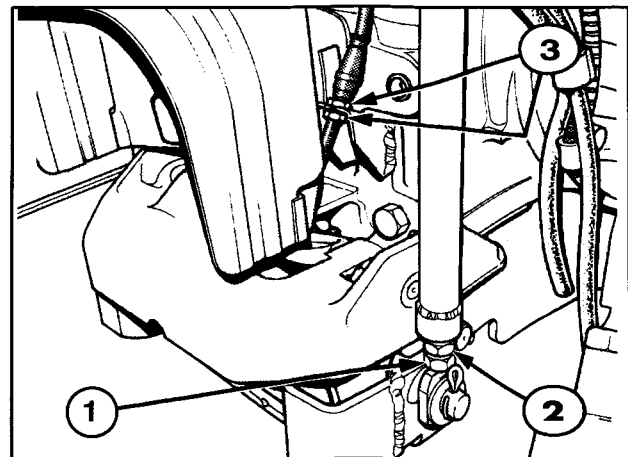
3-130

OPERATION 48

AUTOMATIC PICK-UP HITCH (Not used in North America)

Place a load on the pick-up hitch hook. A trailer or implement is suggested. Ensure that the hitch will latch and unlatch satisfactorily.

If adjustment is necessary, remove the load from the hitch hook. Loosen the locknuts (1) and turn the adjuster (2) on each lift rod equally. Ensure that both hitch lift arms are supporting the hitch equally at the start of raise. Check that the hitch will latch and unlatch.



3-131

When fully raised ensure that the hydraulic system relief valve does not blow or that the hitch lift rods are not under tension. Both these symptoms indicate that the hitch lift rods are too short.

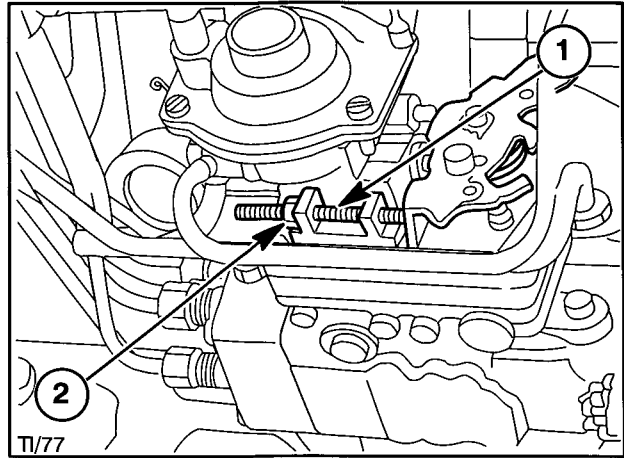
Tighten the locknuts to 72 lbf. ft. (100 Nm).

With the hitch latched in the raised position, adjust the operating cable by means of the adjuster nuts (3) to remove all slack from the inner cable.

OPERATION 49**ENGINE IDLE SPEED**

Loosen the locknut (2) and turn the stop screw (1) to adjust the engine idle speed.

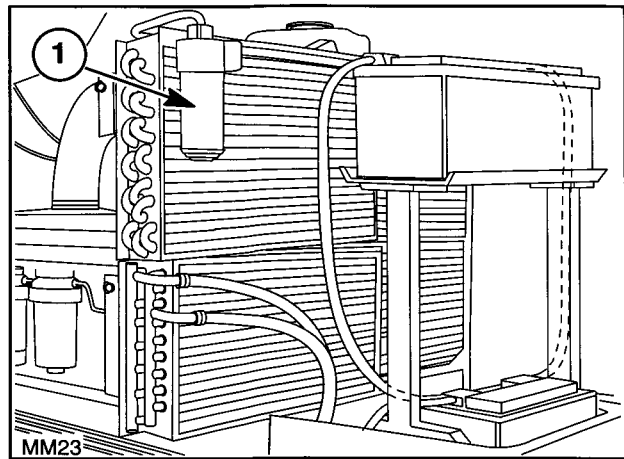
The maximum no-load speed is set in the factory and must only be adjusted, if required, by an authorized dealer.

**3-132****OPERATION 50****AIR CONDITIONER**

If, after several seasons, the air conditioner appears to be less efficient than expected, have the dehydrator filter (1) changed and the complete system checked by your authorized dealer.

WARNING: The refrigerant used in the air conditioner system has a boiling point of -12°C (10°F).

- Never expose any part of the air conditioner system to a direct flame or excessive heat because of the risk of fire or explosion.
- Never disconnect or disassemble any part of the air conditioner system. Escaping refrigerant will cause frostbite. Allowing refrigerant to escape into the atmosphere is illegal in many countries.
- If refrigerant should contact the skin, use the same treatment as for frostbite. Warm the area with your hand or lukewarm water at $32 - 38^{\circ}\text{C}$ ($90 - 100^{\circ}\text{F}$). Cover the area loosely with a bandage to protect the affected area and to prevent infection. Consult a doctor immediately.
- If refrigerant should contact the eyes, wash the eyes immediately with **cold** water for at least 5 minutes. Consult a doctor immediately.

**3-133**

OPERATION 51

TRACTOR STORAGE AND PREPARATION FOR USE

Before storing the tractor for an extended period, the following precautions should be taken:

- Clean the tractor.
- Drain the engine and transmission/rear axle and refill with clean oil.
- Drain the fuel tank(s) and pour approximately two gallons of special calibrating fuel into the tank. Run the engine for at least 10 minutes to ensure complete distribution of the calibrating fuel throughout the injection system. See the next item before running the engine.
- Check the radiator coolant level. If the coolant is within 200 hours of the next change, drain, flush and refill the system. See operation 36 in this section. Run the engine for one hour to disperse the coolant throughout the system.
- Lubricate all grease fittings.
- Using the tractor hydraulic system in Position Control, raise the lift linkage and support the lift arms in the raised position.
- Lightly coat all exposed hydraulic piston rods with petroleum jelly, e.g., power steering cylinder rams, lift assist rams, spool valves, etc.
- Remove the batteries and store in a warm, dry atmosphere. Recharge periodically.
- Raise the tractor and place supports under the axles to take the weight off the tires.
- Cover the exhaust pipe opening.

After extended storage, prepare the tractor for further use, as follows:

- Inflate the tires to the correct pressure and lower the tractor to the ground.
- Refill the fuel tank(s).
- Check the radiator coolant level.
- Check all oil levels.
- Install fully charged batteries.
- Remove the exhaust pipe covering.
- Start the engine and check that all instruments and controls are functioning correctly. Using the tractor hydraulic system in Position Control, fully raise the lift linkage and remove the supports.
- Drive the tractor without a load to ensure that it is operating satisfactorily.

SECTION 4

TROUBLESHOOTING AND FAULT FINDING

INTRODUCTION

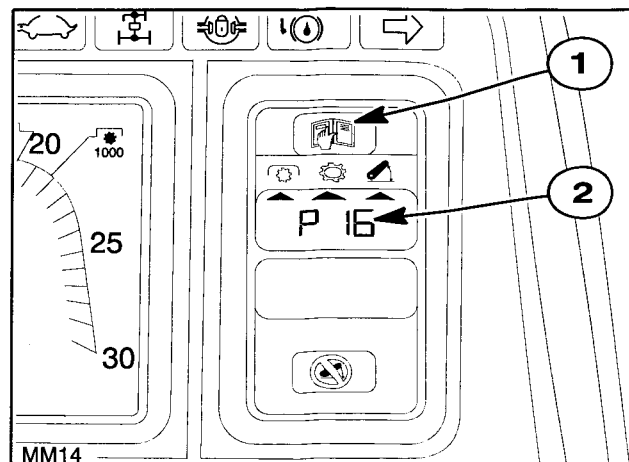
The following information is intended as a guide to assist in identifying and correcting possible tractor malfunctions and fault conditions.

The information provided is as follows:

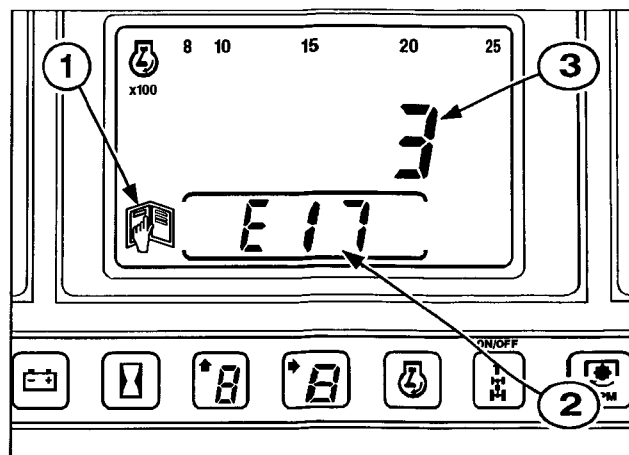
- ERROR CODES
- SYSTEM TROUBLESHOOTING

ERROR CODES

An error code (2) and (3) indicates that there has been a malfunction in one of the electrical systems controlling the instruments, transmission, hydraulics, differential lock, front wheel drive, etc. During operation, the malfunction warning symbol (1) will appear in the liquid crystal display in the instrument console.



4-1

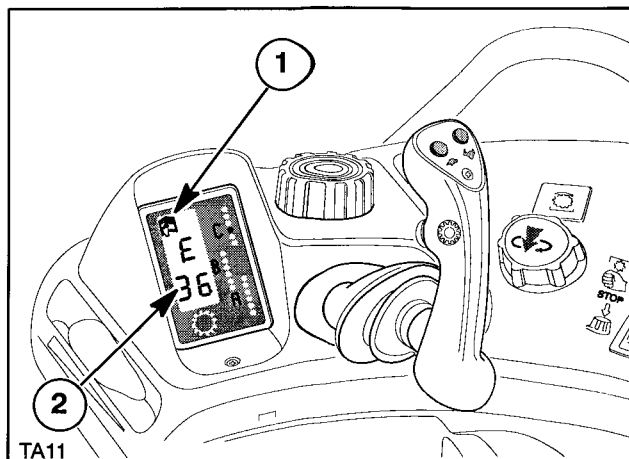


4-2

An error code (2) can also be displayed in the gear display adjacent to the shift control.

Error codes will be displayed as a flashing one, two- or three-digit number and may be preceded by or followed by an identification letter. Additionally, some error codes consist of two letters. The letters and/or numbers will identify the specific circuit in which the malfunction has occurred and type of malfunction, such as short circuit, open circuit, etc.

Contact your authorized dealer for assistance in correcting any malfunction indicated by the appearance of an error code.



4-3

SYSTEM TROUBLESHOOTING

The following information lists possible problems, their cause and corrective action. The systems are listed as follows:

Engine

Transmission – 17 F/18 F x 6 R

Transmission – 23 F x 12 R

Hydraulics

3-point linkage

Brakes

Cab

Electrical

ENGINE

PROBLEM	POSSIBLE CAUSE	CORRECTION
Engine will not start or is difficult to start	Incorrect starting procedure.	Review starting procedure.
	Low or no fuel.	Check fuel level.
	Air in fuel lines.	Bleed fuel system.
	Low ambient temperature.	Use cold starting aid.
	Contaminated fuel system.	Clean and bleed fuel system.
	Fuel lift pump inoperative.	Check fuse. If satisfactory, replace pump.
	Clogged fuel filter(s).	Replace fuel filter element(s).
	Malfunctioning fuel injectors.	See your authorized dealer.
	Malfunctioning fuel solenoid or solenoid relay.	See your authorized dealer.
	Incorrect engine oil viscosity.	Use correct viscosity oil.
	Incorrect fuel for operating temperature.	Use correct type fuel for temperature conditions.
	Slow starter speed.	See slow starter speed in Electrical.
Engine runs roughly and/or stalls	Clogged fuel filter(s).	Replace fuel filter element(s).
	Contaminated fuel system.	Clean and bleed fuel system.
	Fuel solenoid incorrectly adjusted.	See your authorized dealer.
	Fuel tank vent blocked.	Clean vent in clean fuel oil.

ENGINE (continued)

PROBLEM	POSSIBLE CAUSE	CORRECTION
Engine lacks power	Engine overloaded.	Shift to lower gear, reduce draft load or ballast carried.
	Air cleaner restricted.	Service air cleaner.
	Low engine operating temperature.	Check thermostats.
	Engine overheats.	See Engine overheats.
	Clogged fuel filter(s).	Replace fuel filter element(s).
	Incorrect fuel.	Use correct type fuel.
	Incorrect engine valve clearance.	Check and adjust.
	Malfunctioning fuel injectors.	See your authorized dealer.
	Malfunctioning fuel injection pump.	See your authorized dealer.
	Maximum 'no-load' speed set too low.	See your authorized dealer.
	Leaking air intake or exhaust manifold.	Check and rectify or see your authorized dealer.
	Turbocharger malfunctioning (where installed).	See your authorized dealer.
	Implement incorrectly adjusted.	See implement Operator's Manual.
Engine knocks	Fuel injection pump timing.	See your authorized dealer.
	Low engine oil level.	Add oil, as required.
	Low engine oil pressure.	See your authorized dealer.
	Low engine operating temperature.	Check thermostats.
	Engine overheats.	See Engine overheats.
Engine overheats	Low engine oil level.	Add oil, as required.
	Low engine coolant level.	Fill coolant recovery tank. Check cooling system for leaks.
	Defective thermostat(s).	Check thermostat(s).
	Dirty/blocked radiator core.	Clean.
	Excessive engine overload.	Shift to lower gear, reduce draft load or ballast carried.

ENGINE (continued)

PROBLEM	POSSIBLE CAUSE	CORRECTION
Engine overheats	Faulty radiator pressure cap. Cooling system blocked. Loose or worn fan belt. Leaking hose or connection. Malfunctioning temperature gauge or sender. Malfunctioning viscous fan.	Replace cap. Flush cooling system. Check automatic tensioner, replace belt if worn. Tighten connection and/or replace hose. See your authorized dealer. See your authorized dealer.
Low engine operating temperature	Malfunctioning thermostat(s). Viscous fan locked up.	Replace thermostat(s). See your authorized dealer.
Low engine oil pressure	Low oil level. Wrong oil grade or viscosity.	Add oil, as required. Drain and refill with oil of the correct specification.
Excessive engine oil consumption	Engine oil level too high. Wrong oil grade or viscosity. Blocked rocker cover ventilation tube filter. Malfunctioning turbocharger (where installed). External oil leaks. Worn valve guides/seals.	Reduce oil level, as required. Drain and refill with oil of the correct specification. Replace ventilation filter. See your authorized dealer. Repair leaks. See your authorized dealer.
Excessive fuel consumption	Low engine operating temperature. Malfunctioning turbocharger (where equipped). Engine overloaded. Air cleaner restricted. Incorrect fuel. Incorrect engine valve clearance.	See Low engine operating temperature. See your authorized dealer. Shift to lower gear, reduce draft load or ballast carried. Service air cleaner. Use correct type fuel. Check and adjust.

ENGINE (continued)

PROBLEM	POSSIBLE CAUSE	CORRECTION
Excessive fuel consumption (continued)	Malfunctioning fuel injectors.	See your authorized dealer.
	Malfunctioning fuel injection pump.	See your authorized dealer.
	Leaking air intake or exhaust manifold.	Check and rectify or see your authorized dealer.
	Implement incorrectly adjusted.	See implement Operator's Manual.

TRANSMISSION – 18 F x 6 R

PROBLEM	POSSIBLE CAUSE	CORRECTION
Tractor does not drive in any gear	Error code will indicate source of malfunction.	See your authorized dealer.
Gear shift sequence incorrect or gears missing	Error code will indicate source of malfunction.	See your authorized dealer.
Jumping out of gear or holding in gear	Worn synchronisers/couplers.	See your authorized dealer.
Poor inching control when using inching pedal (clutch pedal) or jerky gear shifting	Transmission clutches require calibration.	Perform transmission clutch calibration procedure or see your authorized dealer.
High transmission operating temperature	Low oil level.	Add oil, as required.
	Incorrect oil grade/viscosity.	Drain and refill with oil of the correct specification.
	Dirty or blocked transmission oil cooler.	Clean.
Low transmission oil pressure	Low oil level.	Add oil, as required.
	Incorrect oil grade/viscosity.	Drain and refill with oil of the correct specification.
	Blocked transmission oil filter.	Replace filter.
Noisy transmission	Low oil level.	Add oil, as required.
	Incorrect oil grade/viscosity.	Drain and refill with oil of the correct specification.
	Worn bearings or failed parts.	See your authorized dealer.

TRANSMISSION – 23 F x 12 R

PROBLEM	POSSIBLE CAUSE	CORRECTION
Tractor does not drive in any gear	Error code will indicate source of malfunction.	See your authorized dealer.
Poor inching control when using inching pedal (clutch pedal)	Transmission clutch fill time out of adjustment.	See your authorized dealer.
Jerky gear shifting	Transmission clutches require calibration.	Perform transmission clutch calibration procedure or see your authorized dealer.
Jumping out of gear or holding in gear	Worn synchronisers/couplers.	See your authorized dealer.
High transmission operating temperature	Low oil level. Incorrect oil grade/viscosity. Dirty or blocked transmission oil cooler.	Add oil, as required. Drain and refill with oil of the correct specification. Clean.
Low transmission oil pressure	Low oil level. Incorrect oil grade/viscosity. Blocked transmission oil filter.	Add oil, as required. Drain and refill with oil of the correct specification. Replace filter.
Noisy transmission	Low oil level. Incorrect oil grade/viscosity. Worn bearings or failed parts.	Add oil, as required. Drain and refill with oil of the correct specification. See your authorized dealer.
Gear engagement difficult	Incorrect linkage/cable adjustment or worn linkage. Worn shift forks/selectors. Worn bearings.	Adjust linkage, replace worn parts or see your authorized dealer. See your authorized dealer. See your authorized dealer.
Engine stalls when changing from direct drive to underdrive	Defective direct drive clutch pack.	See your authorized dealer.
Engine stalls when changing from underdrive to direct drive	Defective underdrive clutch pack.	See your authorized dealer.
Engine stalls when changing from forward to reverse	Defective directional clutch pack.	See your authorized dealer.

HYDRAULICS

PROBLEM	POSSIBLE CAUSE	CORRECTION
Hydraulic system does not operate	Error code will indicate source of malfunction. Hydraulics oil level very low. Blocked hydraulic oil filter(s).	See your authorized dealer. Add oil, as required. Replace oil filter(s).
Hydraulic oil overheats	Hydraulics oil level too low or too high. Hydraulics/transmission oil cooler blocked. Blocked hydraulic oil filter(s). Flow control incorrectly adjusted. Hydraulic load not matched to tractor.	Adjust oil level, as required. Clean. Replace oil filter(s). Allow to cool, adjust flow control before operating again. See your authorized dealer.
Remote control valve detent disengages prematurely	Detent release pressure set too low.	Adjust detent pressure or see your authorized dealer.
Remote equipment cylinder operates too fast or too slowly	Flow control incorrectly set.	Adjust flow control.
Remote equipment does not operate	Hoses not correctly connected. Load exceeds system capacity. Remote control valve lever movement restricted.	Attach hoses correctly. Reduce load or use correct size cylinder (see your authorized dealer). Adjust cables or see your authorized dealer.

3-POINT LINKAGE

PROBLEM	POSSIBLE CAUSE	CORRECTION
3-point linkage does not move when control lever is moved	Error code will indicate source of malfunction. Hitch not in phase with the control lever. Fast raise/work switch in raise or external control position. Height limit control incorrectly positioned.	See your authorized dealer. Put lift control lever back in phase with lower links. Put switch in work position. Adjust height limit control.
External power lift control does not operate	Fast raise/work switch not in external control position. Lift control lever not fully forward.	Centralise switch (external control position). Push lever fully forward.
3-point linkage does not raise fully	Height limit control incorrectly positioned.	Adjust height limit control.
3-point linkage drops slowly	Drop rate control incorrectly positioned.	Adjust drop rate control.
3-point linkage slow to respond to draft loads	Position/draft control incorrectly adjusted. Drop rate too slow. Implement not functioning properly.	Adjust position/draft control. Adjust drop rate control. See implement operator's manual.
3-point linkage too responsive to draft loads	Position/draft control incorrectly adjusted.	Adjust position/draft control.
3-point linkage status light flashes continually	Position/draft control incorrectly adjusted. Error code will indicate source of malfunction.	Adjust position/draft control. See your authorized dealer.

BRAKES

PROBLEM	POSSIBLE CAUSE	CORRECTION
Pedal(s) feel spongy	Air in system.	System requires bleeding. See your authorized dealer.
	Low brake reservoir.	Refill reservoir.
Excessive brake pedal travel	Brake piston seal leaking.	See your authorized dealer.
	Brake bleed valve leaking.	See your authorized dealer.
	Leakage in brake valve(s)	See your authorized dealer.
	Worn brake discs.	See your authorized dealer.

CAB

PROBLEM	POSSIBLE CAUSE	CORRECTION
Dust enters the cab	Recirculation doors closed.	Open recirculation doors.
	Improper seal around filter element(s).	Check seal condition.
	Blocked filter(s).	Clean or replace filters.
	Defective filter.	Replace filter.
	Damaged seals around doors/windows or roof hatch.	Replace seal(s).
Low pressurizer air flow	Recirculation doors closed.	Open recirculation doors.
	Blocked filter(s).	Clean or replace filters.
	Heater or evaporator core blocked.	See your authorized dealer.
Air conditioner does not produce cool air	Recirculation doors closed.	Open recirculation doors.
	Heater control turned on.	Turn temperature control knob fully counterclockwise.
	Condenser blocked.	Clean radiator, condenser and oil cooler.
	Drive belt slipping, worn or damaged.	Check automatic belt tensioner and belt condition.
	Low refrigerant level.	See your authorized dealer.

ELECTRICAL SYSTEM

PROBLEM	POSSIBLE CAUSE	CORRECTION
Electrical system completely inoperative	Loose or corroded battery connections. Low battery voltage or sulphated batteries.	Clean and tighten connections. Check battery open circuit voltage for minimum 12.6 volts. Check electrolyte level.
Starter speed slow – engine cranks slowly	Loose or corroded battery connections. Low battery output. Incorrect viscosity engine oil.	Clean and tighten connections. Check battery open circuit voltage for minimum 12.6 volts. Check electrolyte level. Use correct viscosity oil for ambient temperature.
Starter inoperative	Loose or corroded battery or starter motor connections. Dead batteries. Starter safety switch operative.	Clean and tighten connections. Charge and load test replace batteries. Place all gear shift levers in neutral and fully depress clutch pedal.
Alternator light stays on with engine running	Low engine idle speed. Broken/loose drive belt. Malfunctioning batteries. Malfunctioning alternator	Increase engine idle speed. Check belt and automatic belt tensioner. Check battery open circuit voltage for minimum 12.6 volts. Check electrolyte level. Have alternator checked by your authorized dealer.
Batteries will not charge	Malfunctioning alternator Loose or corroded terminals. Loose or worn drive belt. Malfunctioning batteries.	Have alternator checked by your authorized dealer. Clean and tighten connections. Check belt and automatic belt tensioner. Replace belt, if required. Check battery open circuit voltage for minimum 12.6 volts. Check electrolyte level.

SECTION 5

SPECIFICATIONS

The specifications on the following pages are given for your information and guidance. For further information concerning the tractor consult your authorized dealer.

NOTE: *Tire size and manufacturer will effect dimensions. The following dimensions are based on standard tractors equipped with tire sizes as shown:*

Front tires (two wheel drive)
11.00 - 16

Front tires (front wheel drive)
14.9R x 28

Rear tires
18.4R x 38

GENERAL DIMENSIONS

		8160	8260	8360	8560
Height to top of cab	mm	_____	_____	2833	_____
	in	_____	_____	111.5	_____
Height to the top of ROPS	mm	2910	2910	2910	NA
	in	114.5	114.5	114.5	NA
Height to the top of exhaust (two wheel drive)	mm	_____	_____	3035	_____
	in	_____	_____	119.5	_____
Height to the top of exhaust (four wheel drive)	mm	_____	_____	2979	_____
	in	_____	_____	117.3	_____
Minimum ground clearance (under drawbar hanger)	mm	_____	_____	381	_____
	in	_____	_____	15.0	_____
(under front axle) (two wheel drive)	mm	_____	_____	587	_____
	in	_____	_____	23.1	_____
(under front axle) (four wheel drive)	mm	483	483	508	508
	in	19.0	19.0	20.0	20.0

SPECIFICATIONS

GENERAL DIMENSIONS (continued)		8160	8260	8360	8560
Front wheel track setting					
(two wheel drive – minimum)	mm	_____	1543	_____	_____
	in	_____	60.7	_____	_____
(two wheel drive – maximum)	mm	_____	2187	_____	_____
	in	_____	86.1	_____	_____
Front wheel track setting – Manual adjust wheels					
(front wheel drive – minimum)	mm	1552	1552	1525	1525
	in	61.1	61.1	60.0	60.0
(front wheel drive – maximum)	mm	2269	2269	2235	2235
	in	83.3	83.3	88.0	88.0
Rear axle track setting – Manual adjust wheels*					
(minimum)	mm	_____	1530	_____	_____
	in	_____	60.2	_____	_____
(maximum)	mm	_____	2232	_____	_____
	in	_____	87.9	_____	_____
Rear axle track setting – Power adjust wheels*					
(minimum)	mm	_____	1520	_____	_____
	in	_____	59.8	_____	_____
(maximum)	mm	_____	2302	_____	_____
	in	_____	90.6	_____	_____
Rear axle track setting with duals					
(maximum)	mm	NA	NA	3049	3049
	in	NA	NA	120.0	120.0
Minimum width – Manual adjust wheels*					
(across rear tires at minimum track)	mm	_____	2126	_____	_____
	in	_____	83.7	_____	_____
Maximum width – Manual adjust wheels*					
(across rear tires at minimum track)	mm	_____	2748	_____	_____
	in	_____	108.2	_____	_____

* Not available with all tire sizes

SPECIFICATIONS

GENERAL DIMENSIONS (continued)		8160	8260	8360	8560
Minimum width – Power adjust wheels					
(across rear tires	mm		2136		
at minimum track)	in		84.1		
Maximum width – Power adjust wheels					
(across rear tires	mm		2820		
at minimum track)	in		111.0		
Overall length to end of lower links					
(two wheel drive – unballasted)*	mm		4584		
	in		180.0		
(front wheel drive – unballasted)*	mm		4615		
	in		181.7		
*With front end weights add the following to the overall length:					
– Single weights	mm		285		
	in		11.2		
– Double weights	mm		690		
	in		27.2		
Wheelbase (two wheel drive)					
	mm		2752		
	in		108.3		
Wheelbase (four wheel drive)					
	mm		2723		
	in		107.2		
Turning radius (two wheel drive)					
(with brakes, at	m		3.89		
minimum track setting):	ft		12.76		
(without brakes, at	m		4.3		
minimum track setting):	ft		14.15		
Turning radius (front wheel drive)					
at 72 in. (1829 mm) track setting					
(with brakes)	m	3.92	3.92	4.08	4.08
	ft	12.86	12.86	13.4	13.4
(without brakes)	m	4.52	4.52	4.59	4.59
	ft	14.83	14.83	15.1	15.1

SPECIFICATIONS

WEIGHT (two wheel drive – less cab)		8160	8260	8360	8560
On front axle	kg	1700	1700	1700	NA
	lbf	3748	3748	3748	NA
On rear axle	kg	2900	2900	2900	NA
	lbf	6393	6393	6393	NA
Total weight	kg	4385	4385	4485	NA
	lbf	9667	9667	9888	NA
WEIGHT (front wheel drive – less cab)					
On front axle	kg	2000	2000	2000	NA
	lbf	4409	4409	4409	NA
On rear axle	kg	2900	2900	2900	NA
	lbf	6393	6393	6393	NA
Total weight	kg	4785	4785	4985	NA
	lbf	10549	10549	10990	NA
WEIGHT (two wheel drive – with cab)					
On front axle	kg	1800	1800	1800	1900
	lbf	3968	3968	3968	4189
On rear axle	kg	3150	3150	3150	3250
	lbf	6945	6945	6945	7165
Total weight	kg	4715	4715	4888	5056
	lbf	10394	10394	10615	11166
WEIGHT (front wheel drive – with cab)					
On front axle	kg	2100	2100	2100	2200
	lbf	4630	4630	4630	4850
On rear axle	kg	3150	3150	3150	3250
	lbf	6945	6945	6945	7165
Total weight	kg	5115	5115	5315	5565
	lbf	11276	11276	11717	12268

NOTE: The above weights are based on the standard build units, without ballast or optional equipment and should be used as a guide only.

SPECIFICATIONS

ENGINE		8160	8260	8360	8560
PTO horse power		90	100	115	130
	kw	67.2	74.6	85.8	97.0
Rated speed	rev/min.	2200	2200	2200	2300
Maximum no load speed	rev/min.	2370 – 2420			2480 – 2530
Idle speed	rev/min.	700 – 800			
Turbocharged		No	No	Yes	Yes
Number of cylinders		6			
Bore	mm	111.8			
	in	4.4			
Stroke	mm	127			
	in	5.0			
Displacement	litres	7.5			
	in ³	456			
Compression ratio		17.5:1			
Firing order		1.5.3.6.2.4			
Valve tappet clearance (cold)					
Intake	mm	0.36 – 0.46			
	in	0.014 – 0.018			
Exhaust	mm	0.43 – 0.53			
	in	0.017 – 0.020			
FUEL SYSTEM					
Injection pump type (distributor)		Bosch VE			
Timing BTDC		6°	6°	6°	6.5°
Injector crack-off pressure	bar	270			
	PSI	3915			

SPECIFICATIONS

COOLING SYSTEM			8160	8260	8360	8560
Type			_____ Pressurised with full flow bypass, _____ recovery tank and filter/conditioner			
Thermostats			_____	2	_____	_____
Begin to open	° C		_____	81	_____	_____
	° F		_____	178	_____	_____
Fully open	° C		_____	95	_____	_____
	° F		_____	203	_____	_____
Radiator pressure cap	bar		_____	1.0	_____	_____
	psi		_____	14.5	_____	_____
Viscous fan – number of blades			_____	5	_____	_____
Fan diameter	mm		_____	508	_____	_____
	in		_____	20	_____	_____

TRANSMISSION AVAILABILITY

23 F x 12 R transmission

23 x 12 with power shuttle	Yes	Yes	Yes	No
with creeper gear				
46 x 24 with power shuttle	Yes	Yes	Yes	No

18 F x 6 R transmission

17 x 6 with power shuttle (2WD)	_____	Yes	_____
18 x 6 with power shuttle (FWD)	_____	Yes	_____
with creeper gear			
30 x 12 with power shuttle (2WD)	_____	Yes	_____
31 x 12 with power shuttle (FWD)	_____	Yes	_____

SPECIFICATIONS

HYDRAULIC SYSTEM AVAILABILITY	8160	8260	8360	8560
-------------------------------	------	------	------	------

Closed center load sensing system with electronic draft control and variable displacement pump

_____ Yes _____

Nominal System Pressure

bar \pm 3.0

PSI \pm 50

_____ 190 _____

_____ 2750 _____

Variable displacement pump

l/min

gal/min

93.5

93.5

93.5

97.8

24.7

24.7

24.7

25.8

THREE-POINT LIFT

Linkage category

standard

optional

II

II/IIIN

II

II/IIIN

II/IIIN

—

II/IIIN

—

Lift capacity

24 in. (610 mm) to the rear of link ends

kg

lbs

4430

4430

5534*

12000*

5534*

12000*

*with assist ram

BRAKES

Independent footbrakes

— Oil immersed disc acting on each differential shaft —

Hydraulic, self adjusting

_____ Yes _____

Parking brake

— 3 oil immersed discs acting on bevel pinion shaft —

SPECIFICATIONS

STEERING		8160	8260	8360	8560
Type		— Hydrostatic with tilt/telescopic steering wheel —			
Maximum pressure	bar	_____ 166 – 178 _____			
	PSI	_____ 2500 – 2600 _____			
Front wheel toe-in two wheel drive	mm	_____ 0 – 13 _____			
	in	_____ 0 – 0.5 _____			
Front wheel toe-out front wheel drive	mm	_____ 0 – 6 _____			
	in	_____ 0 – 0.25 _____			
POWER TAKE-OFF					
2-speed, independent P.T.O. (electro-hydraulic operation)		_____ Yes _____			
Independent P.T.O. – engine speed at:					
540 rev/min P.T.O. speed	engine rev/min.	_____ 1970 _____			
1000 rev/min P.T.O. speed	engine rev/min.	_____ 2120 _____			
ELECTRICAL EQUIPMENT					
Batteries		_____ 2 – mounted on front support _____			
CCA Rating		_____ 900 x 2 _____			
Alternator – less cab – with cab		_____ 70 amp _____			
		_____ 100 amp _____			
Starter Motor		_____ Positive engagement, solenoid operated _____			
		_____ 3.6 kw _____			

SPECIFICATIONS

LUBRICANT AND FLUID CAPACITIES		8160	8260	8360	8560
Main Fuel Tank	Litres			220	
	gal			58	
Total Fuel Capacity with auxiliary tank	Litres			325	
	gal			85.1	
Cooling System – with cab	Litres	25.5	25.5	26.0	26.0
	gal	6.7	6.7	6.8	6.8
Cooling System – less cab	Litres	23.5	23.5	24.0	24.0
	gal	6.2	6.2	6.3	6.3
Engine Oil (including filter)	Litres			19.0	
	qts			20	
Front Wheel Drive Front Hubs (amount shown for one hub only)	Litres	1.7	1.7	2.15	2.15
	qts	1.8	1.8	2.3	2.3
Front Wheel Drive Differential Case	Litres	9.0	9.0	14.0	14.0
	gal	2.3	2.3	3.7	3.7
23Fx12R					
Transmission/Rear Axle/ Hydraulic System	Litres	73	73	73	NA
	gal	19.2	19.2	19.2	NA
17F/18Fx6R					
Transmission/Rear Axle/ Hydraulic System	Litres	90.0	90.0	90.0	100.0
	gal	23.7	23.7	23.7	26.4

NOTE: When operating remote cylinders, the rear axle oil level will be affected. When topping up the rear axle to accommodate the oil requirement of remote cylinders, no more than 11.8 gallons (45 litres) should be added to bring the oil level up to the full mark on the dipstick when all rams are fully extended.

Remote cylinders with a total oil capacity of up to 4.7 gallons (18 litres) may be connected to the tractor hydraulic system without adding oil, provided the tractor is being operated on level ground.

SPECIFICATIONS

LUBRICANT AND FLUID SPECIFICATIONS

(all models)

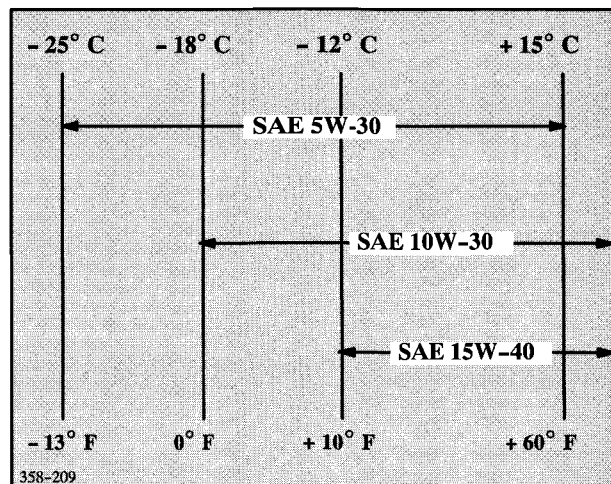
Application	NH Recommended Product	Specification
Transmission/rear axle/hydraulics, hydrostatic steering, front wheel drive front axle casing and front hubs	Multi-grade Transmission and Rear Axle Oil	ESN-M2C134-D
Brake reservoir	Brake fluid	82865344
All lubrication fittings	SAE Multipurpose Grease extreme pressure (EP) high temperature all weather	86050059
Cooling system	Antifreeze (50%) plus clean, soft water (50%)	ESE-M97B18-D
Engine	Premium Gold Multi-grade Engine Oil	API CF-4:SAE 15W40

Choose the correct engine oil viscosity grade from the chart on the right.

NOTE: In areas where prolonged periods of extreme temperatures are encountered, local lubricant practices are acceptable; such as the use of SAE 5W in extreme low temperatures or SAE 50 in extreme high temperatures.

Sulphur in Fuel

The engine oil change period is shown in section 3. However, locally available fuel may have a high sulphur content, in which case the engine oil change period should be adjusted as follows:-



Sulphur Content %

Below 0.5

0.5 – 1.0

above 1.0

Oil Change Period

Normal

Half the normal

One quarter normal.

The use of fuel with a sulphur content above 1.3% is not recommended.

CHECK AND ADJUST, AS REQUIRED**INOPERATIVE SERVICE CHECKS:**

1. Tire pressures and condition ☐
2. Lift-rod levelling for proper operation ☐
3. Radiator coolant level and specific gravity
(1.071–1.083 at 60° F (16° C)) ☐
4. Poly V belt ☐
5. Drain fuel filter and water separator ☐
6. Engine oil level ☐
7. Transmission/rear axle oil level ☐
8. Front axle differential oil level (FWD) ☐
9. Front axle hub oil level (FWD) ☐
10. Brake master cylinder fluid level ☐
11. Clutch master cylinder fluid level
(non-North America) ☐
12. Check brake pedal equalization ☐
13. Handbrake cable adjustment ☐
14. Upper link, drawbar and pin in position ☐
15. Wheel-to-rim clamp bolts and lock nuts
for tightness ☐
16. Wheel disc-to-hub nuts for tightness ☐
17. Front end weight clamp bolts for tightness ☐
18. Front axle support bolts for tightness ☐
19. Front axle spindle nuts for tightness (2WD) ☐
20. Front wheel toe-in/toe-out (2WD or FWD) ☐
21. Fuel level ☐
22. Sheet metal and paint condition ☐
23. Lubricate all grease fittings ☐
24. Check air cleaner and hose connections ☐
25. Seat mounting and adjustment ☐
26. Cab door and lock operation and seal
condition ☐
27. Cab interior upholstery, trim and mouldings ☐
28. Cab window operation, window props and
latches, seal condition ☐
29. Cab sun visor operation ☐
30. Cab filter installation ☐
31. All electrical cables, terminals and wires ☐

SAFETY ITEMS CHECKS:

1. Seat belt installed ☐
2. Safety decals installed ☐
3. Safety start switch operative ☐
4. Parking brake operation ☐
5. Flashing lights/tail lights operation ☐
6. Operator's Manual supplied ☐
7. P.T.O. guard installed ☐
8. S.M.V. emblem installed ☐

OPERATIVE SERVICE CHECKS:

All operative checks are to be performed with the tractor at normal operating temperature.

1. Lights and instruments for proper operation ☐
2. Windshield wipe/wash operation ☐
3. Fluid and oil leaks ☐
4. Maximum no-load speed and idle speed
adjustments and fuel shut-off ☐
5. P.T.O. operation ☐
6. Hydraulic System:
Draft and Position Control operation ☐
- Flow control operation ☐
- Remote control valve operation ☐

PERFORMANCE SERVICE CHECKS:

1. Engine operation including throttle and
governor operation ☐
2. Transmission, including clutch ☐
3. Steering control ☐
4. Differential lock engagement and
disengagement ☐
5. Brake action ☐
6. All optional equipment and
accessories ☐

INSPECTION PERFORMED – WARRANTY EXPLAINED

TRACTOR MODEL NO. TRACTOR SERIAL NO.

OWNER'S SIGNATURE

DATE

DEALER'S SIGNATURE

DATE

CHECK AND ADJUST, AS REQUIRED**INOPERATIVE SERVICE CHECKS:**

1. Tire pressures and condition ☐
2. Lift-rod levelling for proper operation ☐
3. Radiator coolant level and specific gravity
(1.071–1.083 at 60° F (16° C) ☐
4. Poly V belt ☐
5. Drain fuel filter and water separator ☐
6. Engine oil level ☐
7. Transmission/rear axle oil level ☐
8. Front axle differential oil level (FWD) ☐
9. Front axle hub oil level (FWD) ☐
10. Brake master cylinder fluid level ☐
11. Clutch master cylinder fluid level
(non-North America) ☐
12. Check brake pedal equalization ☐
13. Handbrake cable adjustment ☐
14. Upper link, drawbar and pin in position ☐
15. Wheel-to-rim clamp bolts and lock nuts
for tightness ☐
16. Wheel disc-to-hub nuts for tightness ☐
17. Front end weight clamp bolts for tightness ☐
18. Front axle support bolts for tightness ☐
19. Front axle spindle nuts for tightness (2WD) ☐
20. Front wheel toe-in/toe-out (2WD or FWD) ☐
21. Fuel level ☐
22. Sheet metal and paint condition ☐
23. Lubricate all grease fittings ☐
24. Check air cleaner and hose connections ☐
25. Seat mounting and adjustment ☐
26. Cab door and lock operation and seal
condition ☐
27. Cab interior upholstery, trim and mouldings ☐
28. Cab window operation, window props and
latches, seal condition ☐
29. Cab sun visor operation ☐
30. Cab filter installation ☐
31. All electrical cables, terminals and wires ☐

SAFETY ITEMS CHECKS:

1. Seat belt installed ☐
2. Safety decals installed ☐
3. Safety start switch operative ☐
4. Parking brake operation ☐
5. Flashing lights/tail lights operation ☐
6. Operator's Manual supplied ☐
7. P.T.O. guard installed ☐
8. S.M.V. emblem installed ☐

OPERATIVE SERVICE CHECKS:

All operative checks are to be performed with the tractor at normal operating temperature.

1. Lights and instruments for proper operation ☐
2. Windshield wipe/wash operation ☐
3. Fluid and oil leaks ☐
4. Maximum no-load speed and idle speed
adjustments and fuel shut-off ☐
5. P.T.O. operation ☐
6. Hydraulic System:
Draft and Position Control operation ☐
- Flow control operation ☐
- Remote control valve operation ☐

PERFORMANCE SERVICE CHECKS:

1. Engine operation including throttle and
governor operation ☐
2. Transmission, including clutch ☐
3. Steering control ☐
4. Differential lock engagement and
disengagement ☐
5. Brake action ☐
6. All optional equipment and
accessories ☐

INSPECTION PERFORMED – WARRANTY EXPLAINED

TRACTOR MODEL NO. TRACTOR SERIAL NO.

OWNER'S SIGNATURE

DATE

DEALER'S SIGNATURE

DATE

CHECK AND ADJUST, AS REQUIRED**INOPERATIVE SERVICE CHECKS:**

1. Tire pressures and condition ☐
2. Radiator coolant level and specific gravity
(1.071–1.083 at 60° F (16° C)) ☐
3. Poly V belt ☐
4. Change fuel filter drain water separator
and bleed system ☐
5. Change engine oil filter ☐
6. Drain engine oil and refill ☐
7. Change hydraulics/transmission filters ☐
8. Change front axle differential oil (FWD) ☐
9. Change front axle hub oil (FWD) ☐
10. Brake master cylinder fluid level ☐
11. Clutch master cylinder fluid level
(non-North America) ☐
12. Check brake pedal equalization ☐
13. Handbrake cable adjustment ☐
14. Wheel-to-rim clamp bolts and lock nuts
for tightness ☐
15. Wheel disc-to-hub nuts for tightness ☐
16. Front end weight clamp bolts for tightness ☐
17. Front wheel toe-in/toe-out (2WD or FWD) ☐
18. Fuel level ☐
19. Grease front wheel bearings (2WD) ☐
20. Lubricate all grease fittings ☐
21. Adjust engine valve clearance ☐
22. Clean air cleaner element and check
hose connections ☐

SAFETY ITEMS CHECKS:

1. ROPS or cab or safety frame bolt torque ... ☐
2. Safety start switch operative ☐

OPERATIVE SERVICE CHECKS:

All operative checks are to be performed with the tractor at normal operating temperature.

1. Lights and instruments for proper operation .. ☐
2. Windshield wipe/wash operation (cab) ☐
3. Fluid and oil leaks ☐
4. Maximum no-load speed and idle speed
adjustments and fuel shut-off ☐
5. P.T.O. operation ☐
6. Hydraulic System:
Draft and Position Control operation ☐
Flow control operation ☐
Remote control valve operation ☐
7. Transmission clutch pedal disconnect switch
adjustment ☐

PERFORMANCE SERVICE CHECKS:

1. Engine operation including throttle and
governor operation ☐
2. Transmission, including clutch ☐
3. Steering control ☐
4. Differential lock engagement and
disengagement ☐
5. Brake action ☐
6. All optional equipment and
accessories ☐

SERVICE PERFORMED

TRACTOR MODEL NO.

TRACTOR SERIAL NO.

OWNER'S SIGNATURE

DATE

DEALER'S SIGNATURE

DATE

CHECK AND ADJUST, AS REQUIRED**INOPERATIVE SERVICE CHECKS:**

1. Tire pressures and condition ☐
2. Radiator coolant level and specific gravity
(1.071–1.083 at 60° F (16° C) ☐
3. Poly V belt ☐
4. Change fuel filter drain water separator
and bleed system ☐
5. Change engine oil filter ☐
6. Drain engine oil and refill ☐
7. Change hydraulics/transmission filters ☐
8. Change front axle differential oil (FWD) ☐
9. Change front axle hub oil (FWD) ☐
10. Brake master cylinder fluid level ☐
11. Clutch master cylinder fluid level
(non-North America) ☐
12. Check brake pedal equalization ☐
13. Handbrake cable adjustment ☐
14. Wheel-to-rim clamp bolts and lock nuts
for tightness ☐
15. Wheel disc-to-hub nuts for tightness ☐
16. Front end weight clamp bolts for tightness ☐
17. Front wheel toe-in/toe-out (2WD or FWD) ☐
18. Fuel level ☐
19. Grease front wheel bearings (2WD) ☐
20. Lubricate all grease fittings ☐
21. Adjust engine valve clearance ☐
22. Clean air cleaner element and check
hose connections ☐

SAFETY ITEMS CHECKS:

1. ROPS or cab or safety frame bolt torque ... ☐
2. Safety start switch operative ☐

OPERATIVE SERVICE CHECKS:

All operative checks are to be performed with the tractor at normal operating temperature.

1. Lights and instruments for proper operation .. ☐
2. Windshield wipe/wash operation (cab) ☐
3. Fluid and oil leaks ☐
4. Maximum no-load speed and idle speed
adjustments and fuel shut-off ☐
5. P.T.O. operation ☐
6. Hydraulic System:
Draft and Position Control operation ☐
Flow control operation ☐
Remote control valve operation ☐
7. Transmission clutch pedal disconnect switch
adjustment ☐

PERFORMANCE SERVICE CHECKS:

1. Engine operation including throttle and
governor operation ☐
2. Transmission, including clutch ☐
3. Steering control ☐
4. Differential lock engagement and
disengagement ☐
5. Brake action ☐
6. All optional equipment and
accessories ☐

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